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MEMOIR

ON

THE DANGERS AND DEFENCES

OF

NEW YORK CITY

ADDRESSED TO THE

HON. JOHN B. FLOYD,

SECRETARY OF WAR,

BY

JAMES St. C. MORTON,

FIRST LIEUT. ENGINEERS.

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INTRODUCTORY LETTER.

WASHINGTON, DISTRICT OF COLUMBIA,
September 30, 1858.

SIR: I beg leave to lay before you the accompanying *Memoir* on the "Dangers and Defences of New York."

It contains practical ideas relating to a branch of American military science which has as yet been substantially overlooked or neglected by the Bureau to whose province it belongs.

The branch in question, namely, the defence of our sea-board cities against great naval military expeditions, has indeed grown in importance of late years, with electrical rapidity; and it is perhaps excusable, that as yet no actual constructions are to be seen on the Atlantic coasts, attesting the watchfulness and promptness of our Engineer Department.

But the latter should have shown before now, some indication that it has, at least, officially recognized and appreciated the dangers, which, novel in magnitude, have lately begun to threaten the nation.

But as no warning of approaching disaster, much less any provision to meet it, has emanated from the proper official quarter, I conceive that it becomes individual officers to make the government acquainted with the exigencies into which it would be thrown by a war with England or France.

In the first part of the Memoir I endeavor to show that America now lies exposed to the worst effects of a species of warfare, which though of secondary importance when, 40 years ago, the *present system* of fortification was adopted, has received a ten-fold development, and has assumed the proportions of a vital danger, since the construction of steam navies by the great maritime powers.

The landing upon our shores of hostile armies in 1812 and '14 was productive of no greater injury than certain conflagrations, devastations, and plunderings, which served rather to irritate than subdue the spirit of the people: but the campaigns which result from similar expeditions at the present day, exhaust the strength of first-class nations, and their issue decides the terms of peace.

I do not claim originality in this part of my memoir,* for General Gadsden, Major Chase, and Major Sanders, prognosticated, years ago, the worst results from the neglect to provide against hostile descents. If I succeed in placing their views, which coincide with mine as to the nature of the danger, in a striking light, I shall be satisfied; for by so doing I will secure to the second part of the Memoir, which advances an original and entirely novel proposition, an attentive consideration.

* With the exception that I am the first to point out the possibility of a foreign army landing on the outside of Coney Island, and on the northern shore of the Sound.

This proposition consists of a plan or system of fortification for the defence of extensive lines, which, based on the immutable *principles* of the science, departs from old fashioned *rules*, and adapts itself to the latest improvements in the rifle; and which is likewise calculated on the supposition that the reliance of New York, in her necessity, will be her citizen soldiery.

In military statements and arguments, an all-important element is the topography of the country or district concerned; and in this respect I enter on the discussion with unsurpassed advantages.

My duties as Light House Engineer of the New York district, have given me every opportunity to render myself familiar with every part of New York harbor, and all the waters which empty into it, and with its shores on every side: I am also well acquainted with the Sound and outer shores of Long Island: I have travelled habitually over the latter, in every direction; and, in fine, the descriptions of the topography and hydrography of the vicinity of New York and Long Island, which will be found in this Memoir, are the result of thorough personal study and observation of the localities.

As to the existing fortifications of New York, I have certainly a perfect insight into their objects and capabilities, as I was formerly stationed, on regular military duty, at both Fort Hamilton and Sandy Hook.

In conclusion, permit me, Mr. Secretary, to express my profound sense of a two-fold obligation to you; for it was your assigning me to Light House duty that gave me the advantages which impart to my opinions on this subject all the merit they possess: and your habit of encouraging the expression of independent views, by officers of all grades, has emboldened me to advance mine.

I remain, Sir, with the highest respect, your obedient servant,

J. ST. C. MORTON,
First Lieut. Engineers.

Hon. JOHN B. FLOYD,
Secretary of War.

PART I.

CHAPTER I.

At the present moment the United States present towards Great Britain and France an attitude which is parallel in many respects to that of Russia towards the same States in 1853.

The material wealth and integral power of both this country and Russia have rapidly increased to formidable dimensions.

The great extent of both countries, and their comparatively isolated geographical situation have been greatly relied on in each case as securities against foreign invasion, while both have seaports which have been left without adequate defences.

Russia, as well as ourselves, has a navy inferior in size to those of her rivals, and here, indeed, the parallel is least to be insisted on, for our sailors and officers are the best in the world, as well the individual vessels of our fleet, while in both material and "personnel" the Russian navy is far inferior to the French or English. It may be added that while our immense commerce, which, according to tonnage, is the largest in the world, demands a large navy to protect it, that of Russia is small, and her navy is more designed as an aggressive force than to guard her merchantmen. But these points in which the parallel fails will be found to add additional strength to my argument, which, drawn from the comparison, deduces from the policy pursued towards Russia in the eastern war of 1854–'56, the inference that a similar course will be adopted by either of, or both the allies in a future war with the United States.

That policy, of attacking the extremities of the State, and paralyzing them, in the hope of thereby weakening and disordering its vital parts, does not seem to have been premeditated at the outset of the war in question.

The weight and rapidity of the blows that were struck at Sevastopol, Odessa, Kertch, Kimburn, Bomarsund, and Sweaborg do not seem to have been anticipated by the allies, any more than by the Russians.

Whether the governments of France and England were not fully alive to the almost incredible power which they wielded, in their yet untried steam navies, or whether a grand invasion of Russia seemed most likely to bring the Czar to terms, or whether the first proposition to harass the enemy into a peace was overruled by commanders who saw a greater prospect of glory in magnificent combined land operations; whatever, in short, may be the reason for it, this seems highly

probable ; that the policy pursued was the result of circumstances that took place subsequent to the declaration of war.*

This will seem less singular when it is considered that the eastern war is the first in which either side has placed its entire reliance in attempts to ravage and destroy all the military and naval power of the other, that could be reached by the guns of a fleet or by the operations of a land force, debarked from, and co-operating with a fleet.

All maritime expeditions prior to this war have been either vehicles of invasions of magnitude, directed against the capital of the State attacked, or they have had in view the conquest of some province or colony, or the capture of some valuable stronghold, or the ruin or possession of important naval establishments ; in all these cases there is this distinctive essential to be remarked, which is, that they were regarded as either designed to gain a certain definite advantage which was to be attained for itself, without regard to its bearing on the main results of the quarrel, or otherwise were of so serious a nature that the fate of the contest turned inevitably on the issue of one invasion.

The only exception to this is to be found in the American war of 1812–'14 when was organized the policy which is lately proved to be the safest and most effective that can be selected, and which indeed was at that time practiced with terrible effect.

It may be thought that the war referred to, and its incidents, form a sufficient precedent to refer to in an American memoir ; but if I limited myself to it I would be obliged to discuss at length some arguments that might be brought against my conclusions.

It would probably be asserted that the events of 1814 have already received due consideration at the hands of officers fully competent to produce a suitable plan for the defence of the country ; or that it is unlikely that in the present enlightened age we should be subjected to a magnified repetition of the barbarous scenes of that war ; which objections I am in no need of meeting, by taking the more enlarged scope of argument which I adopt.

It may be objected also, that we constituted, in 1812, a second rate power, and that any arguments drawn from the harassing mode of warfare then pursued towards us, and from its distressing effects on the country, might be answered by this objection : that we are now grown to be one of the foremost nations of the earth, and that we are

* The main historical facts which support this view of the case are, the landing at Gallipoli, the construction of entrenchments there, and delay of the allies at this point while the Russians were advancing to the Danube, likewise the protracted stay at Varna, during the period that the Turks were so hard pushed to maintain themselves on the line of the Danube, and in Silistria.

These delays were considered inexplicable at the time, and seem so still, unless we adopt the hypothesis that the allies were at first in hopes of meeting, on Turkish soil, the entire strength of Russia, and that on finding that Nicholas was disposed to preserve a defensive attitude, they counted, at least, on being firmly opposed at the frontier by an army, the beating of which would be a serious blow to the empire; this expectation was also deceived by the tactics of the Russians, who plainly intended to retire before the allies, and not gratify their hopes of delivering a decisive pitched battle.

The vexation and disappointment of Marshal St. Arnaud were excessive on hearing that the siege of Silistria was raised, and that the enemy was retrograding towards the Pruth.

It seems to be at this period that the expedition against Sevastopol was planned, as a means of occupying the army, and as the most important part of the project of ruining the ports, harbors, military depots, and navy of Russia.

beyond the reach of injury from the predatory and destructive system which once did us so much damage. But the system which Great Britain initiated in 1812 has been found effective, thanks to the power of her steam navy, even against the colossal empire of Russia, and hence we may reasonably expect that, in a similar conjuncture of circumstances, it will be adopted without hesitation or delay by either of the Allied Powers with which in future the United States may be engaged.

This supposition is reduced to a certainty by the nature of the additions which are being made to the navies of the former States: the despatch gun-boats, the bomb vessels, the iron floating batteries, and the immense screw steamers, with capacity to transport thousands of troops, all indicate that the policy of 1814 and 1854 is now become a fixed idea with the governments of France and England, to be adopted whenever the occasion serves.

We shall furnish the occasion or grounds of quarrel the moment that we indicate a design to acquire Cuba, or to extend our support to Mexico or the Central American States; then it will be said that, like Russia, we are growing too grasping and formidable, and must be checked and reduced again to a level that shall not endanger the balance of power.

But if our seaports are destined to receive the heaviest shocks from the armaments which were irresistible at Sevastopol and Bomarsund, at least we shall have the satisfaction of acting on the offensive in other quarters.

Our policy would doubtless be to invade Canada, for the third time, if England were our enemy, and Cuba, at any rate, besides; for we are irresistibly drawn to the occupation of that island in time of war with any maritime power by all possible military reasons; and such a course would be sufficiently justified by necessity, as, indeed, have been the precedents of the capture of Gibraltar in 1704, of Malta in 1798, and that of the Danish fleet in 1807.

But if we are to follow this programme, which is surely more congenial to Americans than a passive resistance, however obstinate, and if our regular army and disciplined and enlisted volunteers are to be employed in aggressive campaigns, then it becomes absolutely necessary to organize a seacoast defence, by means of fortifications and militia, that will prevent the necessity of recalling our active armies from the frontier to resist a naval expedition.

The small size, numerically, of an army, will, in our next war, as in the last, occasion us to resort to privateering, except where our ships or squadrons meet with single vessels or fleets of not disproportionate size. We cannot, then, look to the navy for protection to our seacoast cities; and, indeed, if it were twenty times as large, it would be insufficient to guard so many points at once; or even if that were possible, the task should not be assigned to the navy—it should rather be occupied in convoying transports with troops and ammunition to Cuba, or in fighting the enemy's ships and destroying his commerce in distant seas.

It cannot be for a moment supposed that we might rely on the generosity or humanity of the enemy to spare our cities from bombard-

ment. The events of 1812–14 show that it is upon our own resources for defence that we must depend for security. The burning of the Capitol, the marauding expeditions of Admiral Cockburn in the Delaware and Chesapeake, and the expedition of Packenham against New Orleans, where "*booty and beauty*" was the watchword, as well as their Indian allies, with the massacres and scalpings which took place after the defeat of Winchester's army in January, 1813, show what is the nature of British warfare.

The following brief account of the atrocities committed along our sea coast during the war of 1812–14 can be confirmed by many of our citizens, as well as by reference to the histories of the war, of Thomas, Breckenridge, Ingersoll, and others.

In February, 1831, Admiral Cockburn appeared in the Chesapeake, which he laid under blockade, and then commenced a series of attacks against farm houses, gentlemen's seats, &c. These were robbed, the cattle carried off, killed or maimed, and the slaves armed against their masters, or sent off to the West Indies.

The first town attacked was Frenchtown, which was plundered by a detachment of 500 marines, who burnt some houses and vessels at the wharf.

In May, Havre de Grace, Fredericktown, and Georgetown, were visited similarly, and after being thoroughly plundered were partially burnt. During this month reinforcements brought up the strength of the fleet to 7 ships-of-the-line, 12 frigates, and some smaller vessels. On the 18th, the repulse of Cranv island took place, and some circumstances were made the ground of excuse for the barbarous two days sacking of Hampton on the 25th. On this occasion murder and rape were added to the barbarities practiced at other points.

In July, Cockburn, proceeding to North Carolina, treated Ocracoke and Portsmouth as he had the other towns

In 1814 the downfall of Napoleon enabled Great Britain to turn more land forces against us, and her minister threatened to "*chastise us well and to cripple the United States for fifty years to come.*"

This year, at the north, New York, New London, and Boston were blockaded, and Saybrook, Wareham, and Scituate, attacked. At each of these places houses, factories, and shipping were burnt. The repulse at Stonington saved that town from the execution of the British commander's threat of "reducing it to ashes."

In June, operations were resumed in the Chesapeake by the pillaging of Benedict, Marlboro', Kinsale, and Tocomoco.

In August, the British received reinforcements, and, landing at Benedict, marched upon Washington, gaining on the road the battle of Bladensburg, (the details of this expedition are given at length in the chapter on Maritime Expeditions.) Having gained possession of our National Capital, these modern Vandals burnt the Senate House, the Representative Hall, the Supreme Court room, the President's House, and, in a word, all the public buildings except the Patent Office, as well as some private ones.

This expedition likewise pillaged Alexandria, where the city was forced to deliver at the wharves all the merchandise in the storehouses and all the vessels in the vicinity.

Far from the atrocities of these campaigns being universally reprobated and disavowed in England, the spirit of the British seems to have warmed with approbation towards the commanders who executed them.

In an account of the expedition against Baltimore, written shortly after the war, by a British officer, the reason for the admiral's not persevering in the attempt against the city is stated to be, that, from

the distance, and want of conveyances, the *booty* of the place could not be *removed to the ships*.

As the tone and arguments of the history in question were no doubt congenial to the temper of the British at the time it was published, and as I cannot express them as forcibly as I find them, I beg leave to insert the greater part of the author's conclusion. Comment upon it is unnecessary.

The recommendations of the author as to the policy to be pursued in a future war with America, are, in a word, to re-establish the system of 1814 on an immense scale.

"We have long been habituated to despise the Americans as an enemy unworthy of serious regard. * * * * Instead of 1,500, had 10,000 sailed from the Garonne under General Ross how differently might he have acted!"

"There would have been then no necessity for a re-embarkation after the capture of Washington, and, consequently, no time given for the defence of Baltimore, but marching across the country he might have done to the one city what he did to the other. And it is thus only that a war with America can be successfully carried on. * * * America must be assaulted only on her coasts. Her harbors destroyed, her shipping burned, and her seaport towns laid waste, are the only evils she has reason to dread. * * * * *

"To the plan proposed, of making desert the whole line of coast, it may be objected that by so doing we should distress individuals and not the government. But they who offer this objection forget the nature, both of the people whose cause they plead, and of the government under which they live.

"In a democratical government the voice of the people must at all times prevail. The members of the House of Representatives are the very persons who, from such proceedings, would suffer most severely, and we all know how far private suffering goes to influence a man's public opinions. * * * * * * *

"By compelling the constituents to experience the real hardships and miseries of warfare, you will compel the representatives to a vote of peace. * * * Burn their houses, plunder their property, block up their harbors, and destroy their shipping in a few places, and before you have time to proceed to the rest you will be stopped by entreaties for peace."

These expeditions, it will be remembered, took place when England was engaged in a mortal struggle in another hemisphere, and, consequently, at a time when her power was not commensurate with her malice; for this, and for another reason, we may look for still more convincing proofs of my presages of evil in our next war.

The maritime and military resources of England and France have developed wonderfully since 1815. Large fleets of screw steamships, of great tonnage and tremendous armaments; flotillas of shot proof floating batteries, and transport vessels in any quantity, replace the sailing fleets of the last war.

The eastern war of 1854–'56 astonished the world by the display of a colossal maritime power which surprised even the people of the two nations which had been accumulating it without becoming con-

scious of its true extent; and, by the way, it is certain that their present confidence of power is a strong incentive to the exercise of it.

In a former paper, on a kindred subject, I have given tabular statements of the naval and military forces displayed by the allies in the war referred to. Here, it is more to my purpose to give a comparative view of the strength of the expeditions simultaneously engaged in during that contest, and the distance from home at which they operated, and the same information with regard to the most celebrated expeditions of former times.

CHAPTER II.

ON MARITIME EXPEDITIONS.

Before a person can consider himself competent to form an opinion on a weighty military question, especially when probabilities and contingencies are involved, and if he is not enlightened by some personal experience relating to the matter, he must at least acquaint himself with all the precedents which history offers. In this way he will guard against running into extremes, and also will naturally be led to discuss the case in a plain and anti-theoretical manner.

For example: a man who has been at the pains of studying those parts of history which relate to invasions that have taken place across seas, will not believe that telegraphs and railroads protect this country from insult better than entrenchments or forts; neither will he be inclined to trust our defence altogether to gunboats, or iron floating batteries; nor will he fully acquiesce in the more orthodox opinion, that the stone castles which dot our coast, completely provide for our safety.

It does not require, indeed, any great research for a person who has noticed the events of the last ten years, to form some notion of the formidable nature of the naval expeditions that foreign powers can set on foot at the present day; but it is necessary to estimate these also as compared with those of the last century, and still earlier times; this *comparative* power should be considered, in order that the means of resistance may be proportioned accordingly.

Ten years ago we ourselves fitted out a maritime expedition that was almost unexampled for the brilliancy and completeness of its operations; and the expeditions of the British and French to China, the Crimea, and the Baltic, are still fresh in every one's recollection.

But Americans are slow to reflect on the probabilities of similar armaments being turned against their own country; and constantly dismiss the suggestion that such a contingency may arise, with the argument that we beat the British at New Orleans, and that we are better able to receive them now than in 1814.

This blindness with regard to the actual situation of the country is attributable to the fact that we do not realize and appreciate the aggressive power that the *steamship fleets* of England and France possess.

It would seem that with nations, as with individuals, wisdom must be bought at the price of experience; for, with the example of Russia before us, we remain apathetic in the matter of our coast defences.

Russia had, perhaps, a right to suppose Sevastopol too remote to need fortifications on the landward side of its port; but it would be inexcusable heedlessness in us to fail to profit by the lesson that Nicholas received.

Notwithstanding the clearness of the case, however, it seems that there needs some foil or contrast, to set off vividly representations of it, which, alone, would fail of receiving an attentive and reflective examination.

In a word, I can think of no better way of enabling the reader to judge of the magnitude, concentrated strength, and celerity of the present style of naval military warfare, than by presenting him with a condensed summary of the most celebrated maritime expeditions; since by reflecting on the means of national aggression developed in these, and on the *causes* which influenced their success, and by considering afterwards the mutations which these causes have undergone, especially within the present century, we will naturally come to conclusions that will be better founded and more certain than could result from inferences, however logical, drawn merely from the events that have passed within our own knowledge.

I need not say that officers of personal experience, and whose judgment has been formed in the field, may dispense with the aid which is offered by the following historical sketch, but I hope that the latter will be found interesting at least, by this class of readers. It will be seen that I have excluded from this sketch the expeditions of Mahomedan nations; these, though formidable and successful in many instances, such as the expeditions against Candia and Malta, have not been chronicled with much exactness as to numbers; and besides, there are perhaps more than enough to serve my purpose without them. As to the expeditions of ancient history, it would be pedantic to refer to them in this treatise.

It will be found, upon inquiring into the impediments and causes of failure of maritime expeditions, that they may be reduced to three heads:

1st. The effect of winds and weather on *sailing* fleets.

2d. The attacks of the fleets by those of the enemy.

3d. The fatal epidemic diseases of certain climates.

As to the first cause, it has always been the main difficulty of maritime expeditions; and the chances of ill consequences from it have been more numerous in proportion to the distance from home at which the descent was to take place. From the time the transports weigh anchor at their point of departure till the conclusion of the expedition, we find the winds baffling all the calculations of the commander-in-chief.

To guard against the contingencies consequent on the weather, and the inequality in the rates of sailing of the different ships of the flotilla, it has been usual to appoint a rendezvous, at which the latter are all to assemble, within a day or two days' sail of the point of landing. This measure of precaution, though indispensable, has not in every case been successfully carried out. For example: Hoche's expedition, the Invincible Armada, and the projected Boulogne expedition, were all ruined by storms, which either wrecked or dispersed the fleets, and prevented any attempt at debarkation.

Where the objective point has been far distant, the provisioning of the troops, in view of possible detention from adverse winds, has been a serious difficulty.

In cases where the rendezvous has been effected according to the intention, sailing vessels have sometimes been prevented from venturing to lie off the beach selected for debarkation by the danger of being wrecked upon it, in the event of certain winds springing up, and making it a lee-shore. Sometimes the debarkation has been interrupted or suspended, after having commenced, from this cause. The length of time which must elapse between the departure of a fleet of sailing vessels and their arrival off of their destination is necessarily considerable, because the entire convoy must wait upon the slowest vessel in it, and the voyage is thus rendered much longer than the average time. This detention will of course give the enemy so much additional time to prepare for the defence of the point menaced, and will, besides, increase the probabilities of meeting with bad weather.

The uncertainty of the weather has sometimes acted to prevent combinations, at a given time and place, of fleets which happened to be in distant parts, and which might be wanted to act in concert at a fixed time. In a word, the winds and weather, by their uncertainty, variableness, and violence, have always, previous to the invention of steam, been the grand cause of delay, disaster, and sometimes of failure to maritime expeditions; they have, also, indirectly confined within a certain rather low limit the strength of these expeditions, since the difficulties springing from them increase in a rapid ratio with the number of sailing vessels required.

But a consideration even of the few facts presented in the sketches of the Crimean and Bomarsund expeditions, will show that future undertakings of this nature will enjoy an immunity almost complete from difficulties and dangers arising from the winds and waves.

The immense size* which is now given to steamships will render the number of vessels necessary to carry an army very small, so that a rendezvous can be more readily arranged.

The enormous vessels that will hereafter be used, will also be perfectly safe from all the perils of the seas, and their power and speed will render them independent of wind and weather.

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* The "Himalaya" steamship, which was used to carry troops to the Crimea, appears to have answered the purpose admirably, both as to speed and stowage of a great number of men; and the success of this trial, with the demonstration furnished by the building of the "Great Eastern," that the same can be done on a still grander scale, will probably result in the construction of a few monster ships by the British and French, for purposes of distant warfare; indeed, the latter vessel, which can carry 10,000 troops with all their baggage, is to be purchased by Napoleon, for military purposes.

The British Parliament is now considering the proposition of a Liverpool ship-builder, to build six "Mastodonian steamships," to be used for the transportation of troops to distant possessions. Each of these is to be 30,000 tons burthen, and capable of steaming 500 miles a day; they are to be wind-proof, water-proof, and fire-proof, thereby making the perils of the seas a moral impossibility.

The "Napoleon" (French) war steamship is a full-rigged ship with a screw-propeller. Her engine is 900 horse-power, and under steam alone her speed is 13½ knots per hour.

The Napoleon was found capable of towing three ships at once, one of them a three-decker, at the rate of over five knots.

The "Great Eastern" steamship is capable of conveying 10,000 troops a distance as far from England to India, at the same time carrying 18,000 tons of coal and cargo.

CHAPTER III.

SYNOPTICAL ACCOUNT OF MILITARY DESCENTS SINCE 1400 A. D.

Edward III. besieged Calais with 40,000 men, whom he conveyed in 800 vessels of all sizes.

(1414 to 1417.) *Henry V.* entered France with an army of 30,000 men, which were carried over in 1,500 boats and vessels, large and small.

Charles V. took Tunis with 30,000 men and a fleet of 500 vessels.

(1578.) *Sebastian of Portugal* entered on his expedition to Morocco with 20,000 men.

The *Invincible Armada* of Philip II. of Spain, numbered 337 ships, and carried 11,000 sailors and 20,000 soldiers, with 2,630 brass guns; it is well known that a violent storm wrecked half the ships and caused to perish 13,000 men of this expedition.

(1630.) *Gustavus Adolphus* entered Germany with 15,000 or 18,000 men, conveyed thither by a fleet manned by 9,000 sailors.

(1660.) *Louis XIV.* sent an expedition against Ireland which numbered 73 ships-of-war, 29,000 sailors, 5,800 cannon, and 6,000 troops: (this fleet was beaten at the Hogue.)

In 1700 Charles XII. conceived and executed the descent upon Copenhagen, as a diversion which should save the Duchy of Holstein, belonging to his brother-in-law, and invaded by the King of Denmark. He had 20,000 soldiers, in transports, and a fleet which kept at a distance that of the enemy.

Charles' fleet anchored off Humblebeck, three leagues from Copenhagen, and found the Danish army, with cavalry and artillery, drawn up, behind entrenchments, to contest the landing of the troops. The Swedes, however, entered their boats, carrying with them to the shore a great quantity of chevaux-de-frise, and other military implements in flat-bottomed boats, which had been brought for that purpose.

In this order the army approached the beach, the king himself leading the division of 500 grenadiers which formed the advance; on nearing land and getting within wading depth, the whole army, at the example of Charles, threw themselves into the water, and charged the enemy under a violent fire of musketry and artillery; the Danes were driven from their works with precipitation, and Charles, who received next day a reinforcement of 12,000 men, advancing towards the city, made preparations to bombard it.

The Danish king, to save his capital, consented to evacuate Holstein and to pay a ransom of 400,000 rix-dollars; thus this entire campaign, which was completely successful, terminated in six weeks.

In 1747 a British expedition was sent to capture the French fortress of Pondicherry; it was commanded by Boscawen, and consisted of one ship of 74 guns, six of 60 and 64, five of 50, and five carrying from

14 to 40. After 31 days of open trenches, the besiegers were forced to abandon the enterprise.

In 1757 Lally's expedition sailed from Brest, to the East Indies, for the purpose of taking Fort St. David; this fleet, which carried 1,100 troops, was reinforced at Mauritius by 11 sail, and on arriving at Pondicherry, by 1,000 European troops and a corps of Sepoys, bringing up the total force to 5,000 men, a half of whom were Europeans. This expedition was entirely successful, Fort St. David being taken and razed.

In 1775 Charles II. of Spain, sent an expedition to Algiers, commanded by Gen. O'Reilly and Admiral Castejon. The land forces numbered 19,200 picked troops, and were carried in 340 transports, protected by 44 ships of war, manned by 3,300 of the best sailors; the artillery numbered 100 large cannons, and 4,000 mules were taken along for its use, and that of the army generally.

This expedition landed (July 18) on the beach in the Bay of Algiers, in view of 80,000 Turks, of whom two-thirds were cavalry. In the battle which followed, the Spaniards were forced to retreat to their ships, which they did under cover of a slightly built *tête-de-pont*.

In 1796 Hoche's expedition to Ireland left Brest. It numbered 16,000 men, or, according to some accounts, 25,000. The difference is probably the force belonging to the Dutch fleet which was to have sailed from Antwerp and joined Hoche. This junction did not, however, take place.

The expedition was composed of—

15 ships-of-the-line, with 600 troops aboard of each;

12 frigates and 6 corvettes, with 250 troops in each;

A razee, with 400 troops;

6 large vessels, with 2,250 troops;

And a couple of ships for carrying powder and ammunition.

The fleet eluded the British blockading fleet in a fog, and sailed for Bantry bay on the 16th of December. The same day a violent storm dispersed the vessels, and wrecked three of them. The expedition, however, reassembled off Cape Clear, and on the 24th had arrived at its destination, when another tempest forced it to leave the vicinity of the land. This storm was followed by others, and the expedition finally returned, disheartened, on the 1st of January, 1797.

1798. Bonaparte left Toulon with 13 ships-of-the-line, 90 other ships-of-war, and more than 300 transports, and with 23,000 soldiers. A part of this expedition stopped at Malta, and took that place, (though defended by 7,000 men,) and then proceeded to join the main body, which had arrived at Aboukir. The signal victories this expedition gained over the Turks, prove that it would have been, but for the British counter-expedition, an example of a perfectly successful one.

In 1799 the Anglo-Russian expedition to Holland took place. It numbered 40,000 men, and was intended to menace the French on the Meuse and Rhine, and cause a rebellion in Belgium; and, also, it was intended to capture the Batavian fleet of nine ships-of-the-line and some frigates. The latter part of the enterprise succeeded, but for the

rest nothing was accomplished, except the driving of the French from their positions, and the occupying of a small tract of country.

In October, 1800, Admiral Keith appeared off Cadiz with a large fleet, and with numerous land forces. At that time the city was a prey to a violent yellow fever, and its governor appealed to the humanity of the Admiral to spare it an aggravation of its misfortunes. Keith replied by requiring the surrender of all the ships of war in the harbor, and was about to enforce his demand by a debarkation, when he was checked by orders from home, which were the result of fears for the health of the troops. This expedition afterwards formed part of the one next mentioned.

In 1801 Abercrombie's expedition to Egypt occurred. The land forces consisted at first of from 17,000 to 20,000 men ; the fleet, under Admiral Keith, was composed of 4 ships of 80 guns, 3 ships of 74 guns, 5 frigates, 12 brigs, 40 other ships of war, and a flotilla of gunboats. The landing was effected on a sand beach, by means of 100 flat-bottomed boats, each of which carried 50 soldiers, besides the oarsmen. It was successfully executed, though opposed by 2,000 Frenchmen, with some artillery. The fire of some of the smaller vessels of the fleet protected the operation.

In this landing 3,500 men gained the beach at once, and drove off the French, with a loss of 8 guns. Within two weeks Abercrombie gained the decisive battle of Alexandria. As he was joined shortly after by 16,000 more troops, from the East Indies and England, this expedition should be rated at 36,000 men.

In 1807 the British were at war with Napoleon. Both these nations were, at the same time, in a state of profound peace with Denmark—a state which possessed, as its only safeguard, boast, and power, a fleet of 18 ships-of-the-line, 15 frigates, and 25 gun-boats ; besides these and their armaments, and their efficient crews, it possessed immense naval stores of all descriptions. To prevent this fleet coming into the hands of Napoleon, by treaty or otherwise, the British fitted out a *secret* expedition, which announced itself and the declaration of war at the same time. It was composed of 26,000 troops, in an immense number of transports, and protected by a fleet which embraced 21 ships-of-the-line. Appearing before Copenhagen, Lord Cathcart summoned the Danish Prince to place the fleet of Denmark in the hands of the British ; and on receiving a refusal to this outrageous demand, landed his troops between Kronenburg and Copenhagen, drove in the Danish outposts, and planted his heavy ordnance. After ineffectually summoning the city to surrender, Lord Cathcart ordered it to be bombarded, and from the morning of the 3d to the evening of the 5th it was subjected to an incessant storm of shot and shells from 60 mortars and howitzers and 52 twenty-four-pounders. In this barbarous and unequal warfare some two thousand of the inhabitants, of all classes, were killed and wounded, and between six hundred and seven hundred houses were burnt, when, finally, the Crown Prince consented to yield to all the British demands, and so saved the city from being laid in ashes.

In 1808 Sir Arthur Wellesley's expedition to Portugal took place. The mouth of the Mondego river was selected for the landing, because

the French would not be apt to contest it. Between the 1st and the 5th of August, 12,300 men, with all their baggage, artillery, and *materiel*, were landed. On the 17th, marching toward Lisbon, they defeated 14,000 French under Laborde, and on the 19th another brigade was landed at the Bay of Maceira, an open sandy beach, and joined Wellesley. And during the last week in August, Sir John Moore's division landed, also at the Bay of Maceira, (while a furious surf was beating the shore.) All these troops brought the British force up to 25,000 effective men.

A few remarks are here called for by the importance of this successful descent, the difficulties that had to be surmounted, and the risks that were run by Wellesley, in calculating so securely on gaining the battle which must decide the fate of his army. Napier says, that the coast of Portugal, from the Minho to the Tagus, presents, with few exceptions, a rugged and dangerous shore; all the harbors which are presented by the rivers have bars which render access difficult, in most cases, even to boats.

With the slightest breeze from the sea, a terrible surf breaks along the whole line of coast, and forbids all approach; and when the south wind, which commonly prevails from August to the winter months, blows, a more dangerous shore cannot be found in any part of the world.

But, as rivers and mountains, and even the Alps themselves, have proved ineffectual barriers to great captains, so in this case, Wellington contemplated these dangers only with the resolve to overcome them.

A timid or cautious general would have been deterred by considering that a sea breeze might spring up during the debarkation that would leave half his force on land, while the rest was carried off in the vessels, which must gain the open sea or be wrecked on the lee shore; or he would picture to himself the army landed, and separated suddenly from its provisions and artillery by a storm which might drive off the transports before they could be unloaded. In either case, he would expect the ruin of the expedition from an attack upon the force landed by the main body of the enemy.

Or, even if the landing were an entire success, the army would have a very uncertain retreat, or base of operations; and, if worsted by the French, its entire loss might be the consequence of the conjuncture of that event with stormy weather; for a gale from any quarter from south to northwest would have driven away the fleet. To gain a permanent base the British leader had to count on forcing the position of Torres Vedras, and capturing the forts on the Tagus; thus opening the latter harbor to his vessels.

The result, however, demonstrated the wisdom of a bold course; for the weather was tolerably propitious, (though Sir John Moore's division wrecked nearly all its boats in reaching land,) and the French preferred to fight an offensive battle to receiving the attack, as was their best policy.

The convention of Cintra, by which Junot agreed to evacuate Portugal, was the speedy result of the descent just described; and cer-

tainly the magnitude of the gain warranted the risks of the undertaking.

In 1808, the English expedition against Antwerp and Flushing comprised 35 ships of the line, 23 frigates, and other ships-of-war, making a total of 155 ships and 80 gun-boats, manned by more than 30,000 sailors, and carrying 42,000 troops, with 160 pieces of heavy land ordnance, besides the ships' complement of guns.

In the words of Napier, "above 40,000 of the finest of Britain's soldiers, a fleet of power to overthrow all the navies of the world combined; marine and land forces together, more than 80,000 fighting men."

That this expedition, after promptly reducing Flushing and Fort Bartz, was allowed to perish in the marshes of Walcheren, was not the result of military circumstances, but of the incapacity of its commander.

The army of invasion organized by Napoleon at Boulogne numbered 160,000 veteran soldiers: it was to cross in 3,000 gunboats which were built expressly for the purpose, and which were to be protected from the British cruisers by 60 ships of the line; the latter were to rendezvous at Boulogne after deceiving and leading off the enemy's fleet by a feigned expedition into other quarters.

Everything was as perfectly planned as possible, the troops were thoroughly drilled in embarking and disembarking with their arms, baggage, and artillery, and all that was necessary seemed to be the two days required for the crossing, when a conjuncture of unfortunate accidents prevented the occurrence of an event that would have been famous to the end of the world.

1816. Lord Exmouth's expedition to Algiers, in 1816, is pretty well known, and I will limit myself to giving the more important statistics of it.

The fleet consisted of 1 vessel of 108 guns,
1 " 104 "
3 " 74 "
1 " 50 "
2 " 40 "
2 " 36 "
3 " 16 "
4 bomb-ketches and 10 small vessels of 2 guns each, making a total of about 450 guns, with mortars in addition*; this force was joined at Gibraltar by the Dutch fleet of five ships of 36 and one of 24 guns, under Admiral Capellam, raising the number of guns to 652, (some writers have given it as "about a thousand.")

Sailing into the Bay of Algiers, this formidable fleet came to anchor opposite the fortifications, and poured upon them an incessant fire; no less than 50,000 solid shot, or more than 500 tons of metal, and 960 ten and thirteen inch shells, together with rockets, were showered upon the works and city within about six or eight hours.

The fortifications were ruined and the city nearly destroyed, while

* Blofeld's Algeria.

the loss of life, both in the Algerine troops and the inhabitants of the place, was enormous.

The entire Algerine fleet was, in addition, burnt or sunk at its moorings in the harbor.

1830. After a year's blockade of Algiers, the French finally resolved to take the city, and on the 25th of May, 1830, an expedition sailed against it from Toulon; it tarried some time at the bay of Palma in Majorca, but finally arrived in the bay of Torre Chica on the 14th of June.

The number of land forces amounted to 30,000 men, all of whom were landed between 4 and 12 o'clock.

The landing was protected by the fire of two steamers, which aided in repulsing the attacks of the Turkish cavalry, but the French suffered some loss from the fire of certain batteries which were served for several hours against them.

Three days after the landing, the French were attacked by 40 or 50,000 Turks, but repulsed them with loss, as they did also on the 24th and 25th.

The French then advanced on Algiers, and after a short seige, took the place. It contained 1500 brass guns, and money to the amount of $10,150,000, and in its port were 12 vessels of war.

1854. I shall enter more into detail concerning the allied expedition to the Crimea than any former one, for the reason that it presents what I believe to be a presage of the events which will follow the next declaration of war which may be exchanged between this country and England or France.

Nations are hardly more apt than individuals to profit by any experience but their own; but experience of this kind is so dearly bought, that it is worth considering whether a portion of the price might not be advantageously invested as an insurance against the payment of the whole.

In August, 1854, the allied generals resolved upon the expedition to the Crimea; the army had been concentrated at Varna since May, and tired of inaction, made its preparations with great rapidity.

The French constructed barges for the disembarkation of their artillery; each one would carry two pieces complete, with 12 horses and 18 gunners, and drivers. They were to be towed by towboats, and the arrangements were such that in 15 minutes from touching the shore the guns might open fire.

The English provided for the same purpose, platforms which were to rest upon two boats which were to be lashed together.

On the 1st of September, the troops embarked and sailed for the first rendezvous, which was the island of Baltchik: at this place there were assembled 250 vessels of all kinds, having on board 60,000 soldiers in addition to the sailors and marines.

On the 5th the French sailing vessels left Baltchik, and on the 7th the steamships and the British fleet; the general rendezvous was the Isle of Serpents. Three fast steamships were sent in advance to reconnoitre the coast and select a landing place.

On the 11th the British fleet was assembled twenty miles to the north of Cape Tarkeen, and the French fleet opposite the cape, ten

leagues off shore; the next day the reconnoitering vessels returned, and their report caused the point called "Old Fort," near Eupatoria, and only a few miles from the present position of the fleets, to be chosen for the landing.

The shore at that place presented a low strip of beach, which is separated from the shore by three sheets of water of say a mile in length by half a mile in width, and which is joined to the main land by two natural causeways between these sheets of water.

Behind these rose a plateau, which was, however, easily accessible at the distance of a couple of miles from the landing place.

On the 12th the fleets and convoys, which covered a space of seven leagues, sailed for Old Fort; but a squall occurring during the night, the fleets anchored in the bay of Eupatoria, and waited there for the steamers to tow up the convoys.

The 13th was consumed in bringing in the convoys, and the landing took place next day.

The movement of the vessels commenced at 2½ a. m., and by 7½ a. m. they were anchored in their respective positions.

The French ships were drawn up in three lines, each a mile long, in the bay below Old Fort, and the British ones in the next bay, nearer to Eupatoria, farther in or off, according to the draught of the vessels.

Each of the three French divisions was in a single line of ships, and their boats were distinguished by different colored flags; on the arrival of the first boats, the ground to be occupied by each division was marked by its flags.

No Russian troops appeared to contest the landing; but as a precaution, the boats of the 3-deckers were sent ashore first, filled with troops, and provided with Congreve rockets; five vessels were also moored close to the shore, with their broadsides bearing on the beach, and enfilading the road by which the enemy's artillery must approach to annoy the troops.

At 8.30 a. m. the French commander gave the signal for debarkation, and the British one followed in about a half an hour; it would appear that the latter did not arrive in any designated order, but their landing was quite as rapidly effected as the French.

With regard to the latter, the entire first division was set ashore in one trip of the boats; making a force of 9,070 men, 9 guns, and the horses of the general officers, and with provisions for four days, which was transferred from the ships to the beach in fifty minutes.

By noon all the French infantry had landed, and 40 pieces of artillery, and by nightfall the entire debarkation had been effected, all but part of the horses and artillery. The landing of the latter was interrupted at dark by a storm of rain, which put a stop to the operation. On this day the 4th French division and a detachment of British troops, that had on the previous day been making a feint or diversion at Katcha, returned; they had been conveyed in steam-frigates.

On the 15th these troops were all landed, as well as the horses and artillery, in spite of a severe surf which beat upon the beach. As an nstance of its violence, the boat which carried General Forey and his

staff was capsized in the breakers, and the officers saved themselves only by swimming.

The force thus thrown, in a little more than a single day, upon an exposed beach, and one which was likely to be defended by a powerful Russian army, consisted of over 60,000 men and 137 cannon.

The official accounts state the numbers as follows, viz:

English of all arms	27,600 men and	65 guns.
French of all arms	27,800 men and	72 guns.
Turks of all arms	6,000 men.	
Total	61,400 men and	137 guns.

After one day—the 16th—spent on the beach, the French army was ready to march upon Sevastopol; but, to the great chagrin of St. Arnaud, was compelled to tarry for the British, who were so much encumbered with baggage that they did not complete their preparations before the 18th.

On the 19th the allies took up the line of march, and on the 20th, or on the sixth day from that which saw their fleet cast anchor off the Russian coast, they attacked the enemy, under Menschikoff, and forced them from the redoubtable position of the Alma.

As I shall refer to this battle in my remarks on descents, it is worth while to give the statistics of it, as furnished by the French, English, and Russian official accounts.

The Russians were encamped on a position which crossed the great road about 2½ miles from the sea; their front was two miles in extent and protected by the river Alma, which, though generally fordable, had steep banks; the troops were posted on the slopes of the hills in rear of the river; and on the summits, which varied in altitude from 350 to 400 feet, was their reserve. A heavy covered battery flanked the whole of the right of the position, and artillery was also posted so as to command the passages of the river and the approaches generally. A trench some hundred yards long, half way down the slope on the right, afforded cover against an advance.

The Russians had 42 battalions and 16 squadrons, a force estimated by St. Arnaud at 50,000 men, and by Lord Raglan at from 25,000 to 50,000, and they had 82 guns.

The battle, as is well known, was decided by the turning of the left of the position by Bosquet's division, and the Russians retreated behind the Katcha; their loss amounted to 4,500 men, and that of the allies to 3,300 men.

Of the campaigns which succeeded this memorable descent it is not my province to speak, but it is important to my argument to mention the sum total of the troops who were, during the eleven months siege of Sevastopol, thrown upon the shores of the Crimea:

The French troops sent amounted in all to - -	309,268 men.
English - - - - - -	99,618 "
The Sardinians amounted to 10,000, and 7,000 Turks were landed September 14 - - - -	17,000 "
Total - - - - -	425,886 "

excluding what Turkish reinforcements were sent, which brought their numbers to over 8 battalions at a late period of the siege.

The French losses, from all causes, amounted to -	69,229 men.
Those of the English to - - - -	32,290 "
Total - - - - -	101,519 "

It will be observed that losses sustained by the Allies by sickness at Varna or at Gallipoli do not enter into the above table. The entire forces sent by the Allies to the East amounted to a greater figure than the above; for example, the British sent to the East 107,040 men, of whom 70,910 returned with their regiments, the balance being made up of killed, invalided, prisoners, and some deserters.

However, the table above is restricted to an accurate exposition of the power of the expedition, which had for its object the capture of Sevastopol; by its strength, the distance from home at which it operated, the rapidity and certainty of its movements, and by the entire success with which it was crowned, after encountering the utmost rigors of winter, and a defence almost unparalleled for bravery and obstinacy, and unequalled in point of engineering skill, by every criterion; in fact, this expedition far surpasses any previous one in the history of the world.

1854. While the expedition to Sevastopol was assembling at Varna another grand descent was being made upon the Russian establishments in the Aland islands, in the Baltic. This latter expedition consisted of a combined French and English fleet, (which must have been of great power, though I have been unable to find the exact number of vessels and guns,) carrying a land army of 10,000 French and a small force of British troops. The French army was in two brigades, with 200 artillerymen and 150 sappers. The embarkation of the latter took place at Calais, and the fleets rendezvoused first at Faroe sound, then at the anchorage of Ledsund, and finally appeared before Bomarsund on the 7th of August, 1854. They anchored just beyond the range of the guns of the fortress; on the 8th the debarkation was effected by placing the troops in launches, which were towed by row-boats manned by sailors; the main landing was at a point 6 miles southwest of the works, while a body of 3,000 landed 9 miles to the north, to facilitate the investment.

The siege was conducted by land exclusively, except that some vessels (on the 15th) cannonaded the place from a distance of $1\frac{1}{4}$ mile, a range at which many of their shells, even, fell short of the walls; and on the 16th the place surrendered.

The result of this success was the capture of 2,400 troops, of 200 guns, and considerable supplies of powder, balls, and provisions. The Russians likewise lost the costly works that had been built to insure possession of the Aland isles; for, previous to leaving, the allies reduced the main fortress and the towers of Bomarsund to a heap of ruins.

This expedition, in itself, was a great exhibition of power; but when we consider that it was conducted at the same time with the

gigantic and unprecedented one to the Crimea, a vivid idea will be formed of the military and naval resources of France and England.

AMERICAN EXPEDITIONS.

In 1739, England having declared war against Spain, a combined expedition, under Admirals Anson and Vernon, sailed from England and Jamaica to acquire possession of the richest portions of Spanish America. The fleet of the latter took Portobello in November, and afterwards Fort Chagre, on the isthmus; but Anson's squadron, that was to have co-operated on the opposite side, at Panama, had been scattered by storms off the Horn, and Vernon returned without result.

In 1740, (October,) Lord Cathcart's expedition left England, and assembled at Jamaica, where it was joined by a body of colonial troops. It then numbered 29 ships of the line, 80 smaller vessels, and 15,000 sailors, besides 12,000 land forces, equipped with all sorts of warlike instruments and every kind of convenience. This expedition attacked Carthagena, the strongest town in Spanish America, and demolished its fortifications. The excessive mortality in the expedition caused it to return to Jamaica without further effect, in November, 1741, after losing about 20,000 men.

In 1742 the Spaniards collected a large fleet and numerous land forces in Cuba, and made a descent in July, with 36 vessels, upon Forts William and Frederica, on the St. Mary's. They were repulsed by Gov. Oglethorpe.

In 1745 the Louisburg expedition took place. It consisted of 100 vessels, which rendezvoused at Canseau, where they were joined by the squadron of Admiral Warren, from Antigua. After besieging the place by land and sea for six weeks, during which several men-of-war joined the blockading fleet from England, the place capitulated.

In 1746 a large fleet left France under d'Anville, but it effected nothing, having been wasted by storms and shipwrecks.

In 1747 a French fleet sailed with troops for Canada and Nova Scotia, but was encountered by the British fleet under Anson and Warren, and what ships were not taken were forced to retreat.

In 1755 the French sent reinforcements to Canada in 12 ships-of-war, under Dieskau; two of which were intercepted and taken by Admiral Boscawen. Braddock's expedition arrived in America, from England, the same year.

In May, 1758, Amherst's expedition sailed from England, and rendezvoused at Halifax. The fleet was composed of 22 ships-of-the-line and 15 frigates. The army numbered at least 10,000 effective men. It sailed against Louisburg, the French naval station, and arrived in Chapeau Rouge bay, where it waited for six days, whilst a storm rendered a landing impracticable. During this time the French strengthened and extended their lines of field-works and abattis.

On the 8th June the surf was still dashing heavily, when the debarkation took place under the cover of the fire of the frigates. Notwithstanding the French batteries and the capsizing and destruction of several of the boats by the surf, the landing was effected, the French lines taken, and Louisburg invested the same day. In less

than two months the place was reduced to ruins, and capitulated; 5,600 troops and sailors became prisoners, and five ships of the line and four frigates were captured. The rest of the French fleet (five vessels) had been burnt or taken previously.

In January, 1759, Admiral Pococke attacked Martinico with 10 line-of-battle ships and 6,000 effective troops. Being repulsed from that island, he sailed for Guadalupe, which island he took after a struggle of three months.

In June, 1759, the expedition destined to take Quebec rendezvoused at Louisburg. General Wolf commanded the land forces, amounting to about 8,000 men, carried in numerous transports. The fleet, under Admiral Sanders, numbered 20 ships of the line and as many frigates and armed vessels.

On the 26th June the landing took place on the isle of Orleans. On the 29th batteries were erected on the main land opposite Quebec; but though the town was injured by their fire the citadel was beyond their range.

In July, Wolfe attempted to gain a footing on the opposite shore of the St. Lawrence, above the Montmorenci, but was repulsed, with the loss of 400 killed alone.

On the 13th September, having deceived the French as to his intentions, Wolfe crossed to the north shore, above the town, and gained the battle of the Plains of Abraham, which Montcalm preferred to deliver, rather than throw his army into Quebec.

The French, second in command, was obliged on September 17th, from the want of provisions, to surrender the city.

In January, 1762, General Monkton and Admiral Rodney appeared off Martinique, the richest of the French colonies, with a fleet of 16 ships-of-the-line and 13 frigates, and transports containing 12,000 troops; this island was naturally strong and was well fortified, but was taken in about five weeks. The same expedition took Grenada, St. Lucia, and St. Vincents.

In May, the same expedition, having received reinforcements of troops and supplies from the North American colonies and from England, received orders to attack Havana. The land forces now amounted to 11,000 effective English troops, besides the quotas from New York and New England; 2,500 negroes from Jamaica and the Leeward islands, were also enrolled, and subsequently used in the labors of the trenches. After twenty-nine days of open trenches, the Moro Castle was taken by storm, and on the 11th of August the city capitulated.

The fruits of this expedition were the most important naval and military station of the West Indies, 9 ships-of-the-line, and 4 frigates, besides an immense booty, of which the property of the Spanish king alone amounted to $10,000,000.

It succeeded in spite of all the difficulties of a tropical summer, the yellow fever, and a difficult position, improved by strong and well defended fortresses.

In 1769 an expedition set out from Cuba, and arrived before New Orleans with 3,000 chosen troops on board; the commander took

possession, in the name of the Spanish government, of the whole valley of the Mississippi.

(In the preceding year the French inhabitants had rebelled and declared their intentions of joining the colony to France as a dependency, or otherwise of forming an independent republic.)

On the 25th of June, 1776, Sir William Howe arrived off Sandy Hook; Admiral Howe arrived on the 12th July; General Clinton arrived soon after, as did also Admiral Hotham, with troops from Charleston and England.

The army thus united amounted to 24,000 men, English, Hessians, and Waldeckers; they were ready to open the campaign in August.

The battle of Flatbush followed, and resulted in the retreat of the Americans on the night of the 29th.

February 11, 1780, Sir Henry Clinton arrived at John's island, thirty miles from Charleston, having sailed from New York the 26th December. Charleston was defended by General Lincoln, who built a chain of redoubts, lines, and batteries from the Ashley to the Cooper river; these mounted eighty pieces of artillery, and on all sides of the town where a landing was practicable, batteries were erected and covered with cannon.

On the 21st the British fleet crossed the bar, and in a few days the city was invested by sea and by land.

In April, Clinton received a reinforcement of 3,000 men from New York and took Fort Moultrie.

On the 12th of May the city surrendered.

In July, 1780, the French fleet, under the Chev. de Ternay, arrived at Rhode Island; it had two ships of 80 guns, one of 74, two frigates of 40, a cutter of 20, an armed hospital ship, and 32 transports with 6,000 men, under Rochambeau.

In August, 1781, De Grasse's fleet of 28 sail of the line, appeared in the Chesapeake, from the West Indies, and landed 3,200 troops under Marquis de St. Simon, to assist in the siege of Yorktown. Eight more ships-of-the-line arrived soon after, under De Barras, from Rhode Island.

In February, 1794, Admiral Jervis landed at Martinique with 6,000 troops, and took possession of the island, with the exception of the forts, which were occupied by Rochambeau with 800 men. The British were subsequently driven off, a reinforcement having arrived of 1,500 French, from Brest, and the blacks having been enrolled by the latter.

In 1795–'96 Abercrombie retook from the French the island of St. Lucia and Demerara.

In 1802 Leclerc's expedition sailed from France to St. Domingo; it consisted of 20,000 men, who were afterwards reinforced by 15,000 additional troops, making a total of 35,000 soldiers. The fleet numbered 30 ships-of-the-line and 20 frigates. The failure of this expedition was due partly to the vicious plan of operation, but chiefly to the yellow fever which committed dreadful ravages both in the land and naval forces. The army of Toussaint did not exceed 20,000 men, but was exempt from the sickness which carried off almost the whole of the invading troops.

1814. The English expedition, in 1814, against Washington was composed of Admiral Cockburn's fleet in the Chesapeake, reinforced by a squadron with General Ross' army, which embarked at the Garonne river, in France.

The latter fleet comprised thirteen armed vessels and three transports, and carried 2,500 troops: arriving at Bermuda it was joined by three men-of-war, which had on board 1,600 troops; continuing the voyage the combined fleet joined that of the Chesapeake, which consisted of three line-of-battle ships, several frigates, and some sloops-of-war and gun-brigs. There were in this fleet 700 marines and a division of marine artillery, bringing up the land forces to about 5,000 men.

On the 19th and 20th of August the latter were disembarked at Benedict, about fifty miles southeast of Washington. On the evening of the 20th a flotilla was sent, under Cockburn, up the river to attack that of Commodore Barney, which was, however, blown up by the Americans. General Ross, in command of the army, proceeded to Upper Marlborough, where he arrived on the 22d, having marched forty miles in three days. Here he was joined by Cockburn, and the united forces of the expedition marched, the night of the 23d, five miles nearer to Washington.

On the 24th the advances to Bladensburg took place, and our army was beaten. The capture of Washington, and the atrocious treatment our capital received at the hands of the British, are still fresh in the recollection of our citizens.

The attack upon Baltimore, during the ensuing month after the above occurrences, was made by the same expedition, which, having received on board the army, again disembarked it at North Point, on the Patapsco, thirteen miles from the city.

The repulse of the combined attack of the enemy on this occasion, and their retreat to the ships, are well known; and I will take advantage of the circumstance to conclude my reference to this expedition, the main facts relating to which I have already given, viz: the numbers of the vessels and land forces, and the distance from which they came.

1815. The expedition which had performed the exploit of burning the American Capital proceeded from the Chesapeake to Jamaica, (two ships only excepted, which were sent to England with wounded and prisoners.) Here they were joined by a fleet of men-of-war and transports carrying 2,500 infantry, six companies of rifles, two squadrons of dismounted dragoons, detachments of engineers, artillery and rockets, and also recruits for the regiments that had served in the Chesapeake. Major General Keane arrived in this fleet, and took command of the whole.

Having set sail from Jamaica on the 20th November, the expedition reached the mouth of the Mississippi, or rather they anchored opposite the Chandeleur islands, near the entrance of Lake Borgne. Here the plan of attack was concerted.

Considering it impracticable to reduce the forts which commanded the navigation of the river, and as the ships could not pass up unless this were effected, it was decided to land on the banks of the lake,

and make a push for the city before any strong defences could be prepared by the Americans.

The troops being got on board, the lighter vessels entered the lake on the 13th of December. They were opposed by the American gunboats, which were, however, captured by a flotilla of fifty launches and barges.

The vessels now penetrated as far as their draught allowed, and on the 16th began to debark their detachments upon a sandy strip called Isle au Poix, at the mouth of Pearl river. The vessels had to send their boats for this purpose nearly thirty miles, and the soldiers underwent great hardships from the total want of tents or fuel.

The entire force was not debarked until six days had elapsed, and the whole week was consumed in the operation, in organizing the troops into divisions, and assembling boats, packing ammunition, stores, &c.; and it must be recollected that the British were as yet only in possession of a barren island.

The debouches of Bayou Catalan or Bienvenu into the lake, about thirty miles, or a day's sail from the island, was selected as the point of landing, and the advance guard of 1,600 men and two guns was sent there to seize on a favorable spot. These surprised the guard, and then pushed up the river to Villeré's canal, where, having encamped, they sustained a severe attack from our troops under Jackson and General Coffee, who were aided by the fire of the schooner Caroline, under Commodore Patterson.

The whole British army hastened at the sound of the cannonade to effect its landing, and by the 24th it was all in the position first occupied by the advance guard.

General Jackson, finding that his attack on the advanced guard had rendered the enemy cautious, and would prevent an immediate march upon the city, decided to improve the time by entrenching himself, and selected the position which lay in rear of the Rodriguez canal. This position was 1,620 yards in extent, resting its right and left on the river and on a swamp respectively, and was protected in front by the canal.

The entrenchments consisted simply of a parapet of earth running in a right line from the river to the swamp, where it took a square turn to the rear; an unfinished redan was just beyond the ditch, at the junction of the line with the river.

The canal formed a wet ditch for the entrenchment. It had five feet of water in some parts, but in others was very shallow; its banks were, however, very slippery and soft, from the effect of rain and the opening of the levees. The defenders of the position amounted at this time to about 2,000 men, and this force repelled (as will be mentioned) the first attack of the British. In the grand attack, the army under Jackson amounted to 3,500 or 3,700 men, as he was joined on the 4th by 2,500 Kentuckians, of whom about 1,500 were detached to garrison the battery on the right bank.

The British army now landed had, on entering the ships, amounted to about 8,000 soldiers, and it seems probable that, with Lambert's reinforcement and with the marines, the number that took part in the battle of the 8th of January was about 10,000.

While the Americans were fortifying their position, and the main army of the enemy was concentrating in advance of it, the British had thrown up batteries, which, firing hot shot at the Caroline and Louisiana, had burnt the one and dislodged the other from her position, which had prohibited an advance along the levee.

The way being now clear, the British advanced on the 28th, and, on approaching the American line, opened a fire of cannon, bombs, and rockets, which they followed up by a violent attack, which lasted seven hours, resulting in the repulse of the enemy.

At this juncture the British were reinforced by 1,600 infantry under General Lambert, who thus arrived in time to assist in the decisive battle of the 8th.

General Pakenham, who had also arrived from England and taken command just previous to the advance, now concluded to abandon the idea of storming the American lines, and to commence his attack by a heavy cannonade, which should breach the works and silence their artillery. Accordingly thirty heavy guns were brought up from the ships, and were mounted, on the 31st, in six batteries, which opened fire next day.

The delay caused by bringing up the guns was improved by Jackson, and the American batteries were so strong by this time, that they silenced the British fire and drove the artillerists from their pieces. This success was greatly contributed to by the flotilla and by the battery which Jackson had thrown up on the opposite side of the river, both of which took the enemy's line in flank. An attempt to turn the American left, by an attack from the swamp, was also defeated.

The success of a future attack seemed, therefore, to depend on silencing the battery across the river, and there was no way of doing so but to take it. To this end General Pakenham, who displayed certainly much energy, ordered Villerés' canal to be deepened so as to admit of passing the boats upon the Mississippi from the bayou, which should carry a detachment to the opposite shore. The canal being finished on January 6th, Pakenham ordered Colonel Thornton to cross the river on the night of the 7th, and take the important battery. The capture was to be announced by a signal rocket, when the main body was to commence its attack on Jackson's line. This programme of attack was very simple, and its failure in execution was not due to any ill-conduct of the British troops.

The battery on the opposite bank was carried by 500 British, and was held during the main attack by Colonel Thornton, while the army of Pakenham performed prodigies of valor in the attempt to storm the works, but, as it is universally known, the courage of the troops sufficed only to increase their losses.

My object has been chiefly to exhibit clearly the difficulties of the landing; and to bring the enemy from his ships to the point where the result of the expedition depends upon the fate of a battle on land; the chances, at this crisis, of the success or failure of the expedition may be calculated on general principles, seeing that all the marine probabilities which are especially under consideration, and at the outset of the expedition counted against it, are by this time eliminated.

It is sufficient, therefore, to state that in this short campaign the British lost near 5,000 men. In the battle of the 8th January General Lambert reported a loss of 2,070, and Colonel Haynes of 2,600.

The result of this tremendous defeat was the retreat of the whole force, and their re-embarkation, an operation which was conducted with great energy, and without serious loss. It was rendered tedious by the necessity that now existed of constructing a brush road over the swamp to the place where the troops must re-enter the boats. This road took nine days to construct, and it was not till the night of the 18th that the beaten army was ready to evacuate its position.

It regained the point of embarkation by a stolen night march, and finally found itself once more aboard the fleet, though the operation of transferring the troops to the vessels lasted several days, owing to the prevalence of foul weather, and the distance of the vessels, which were about a day's pull, in boats, from the shore.

While the points of this history remain unconfused by the accounts of more powerful expeditions, it will be well to deduce some conclusions from it that it will be useful to refer to in the sequel.

In the first place, it appears that a force of about 10,000 men succeeded in overcoming all the difficulties of concentration at one point, although starting in detached corps from the Mediterranean, France, England, and the West Indies. Next, they accomplished their debarkation at a place perhaps the worst adapted in the world for such operations, owing to the shallowness of the water and its muddy shores, and the contracted avenues to the objective point. Third, their advanced guard had actually reached the highway to New Orleans, and had but to disperse or defeat an army of about its own numerical force, and composed of irregular troops alone, in order to complete the success of the expedition.

That it did not do so must be imputed, *cæteris paribus*, to a want of military tact in the commander-in-chief, or his neglect of his duty; for had he informed himself of the number of his enemy's forces, it is plain that every rule of warfare would counsel him to attack at once, without giving time for entrenchments to be built and reinforcements to arrive.

That the expedition was not successful appears, therefore, to have been due first to the bad generalship of Pakenham, and secondly to the genius and heroism of Jackson, who used to the uttermost the time, the locality, the resources at his disposal, and the militia under his command.

I repeat, that the expedition was successful in so far that the result of it depended on military operations entirely disconnected with the fact of its being a maritime expedition; and that even in these operations the probabilities, as they would be estimated if the numbers and tactical positions of the armies were alone considered, and the genius of Jackson left out of consideration, were greatly in favor of the invaders up to *the very moment when the retreat of the British began.* Even after the blunder of not marching at once on New Orleans; after the dilatory and undecided conduct of the British general between the 24th December and 8th January, which gave Jackson time to consolidate his lines and batteries, and to double his army

and after the terrible slaughter of the British in the battle of the 8th, there was still an even chance at least, for the commander-in-chief to reckon upon, provided only he had judgment and decision enough to appreciate and make use of it. I allude to the success of the enemy on the right bank, which would have been enough in the hands of a general like Jackson, had the British such a one, to insure the forcing of the American lines;* after that, the British would have been superior in numbers, artillery, and discipline; and if they were beaten in the open field, it would have been for want of a leader equal to the illustrious warrior whom Providence assigned to the command of our army.

This speculation upon the abstract probabilities which related to the battle of the 8th of January is offered merely as an exercise, as I may say, to assist the reader in understanding the general discussion in hand: it no more reflects on the imperishable glory of our arms to say that Jackson was out-flanked at New Orleans, than to say that General Taylor was surrounded at Buena Vista. In both cases the disadvantages under which the generals labored, enhance their reputation.

1847. The expedition which under SCOTT subjugated Mexico is still so fresh in the minds of Americans that I shall not refer to any other pages of its history than those which relate the manner in which the landing was effected.

As a military operation the landing will always be a model for imitation, both as to the arrangement of the plan, and the details of its execution; the enemy were to the last moment in doubt as to the place selected for the debarkation, but even if they had divined it, or been secretly advised on the subject, the nature of the locality and the measures adopted by the general to cover the operation would have insured its success, though opposed by the whole disposable Mexican force.

The expedition, as is well known, rendezvoused at Lobos, where the army was organized; the troops detached from General Taylor's command had assembled by the end of January at Brazos St. Jago and Tampico, and were sent from thence to Lobos, a distance of about 60 miles; the rest of the troops arrived at the rendezvous from New Orleans.

On the 2d of March the transports all sailed for Anton Lizardo, and preparations were made for the landing, which General Scott decided to effect on the sandy beach, at a point west of Sacrificios island, and about three miles south of the city and castle of Vera Cruz.

One hundred and forty-four surf boats had been ordered for the landing, but 65 only had arrived; these were to be towed behind the ships from Anton Lizardo to the landing place, when the troops were to enter them, and make the shore under cover of the guns of the smaller vessels, which would be so disposed as to sweep the beach by their fire.

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* In support of this view, see Jackson's despatch to the War Department, in which he says that "The enemy now occupied a position from which they might annoy us without hazard, and by means of which they might have been able to defeat, in a great measure, the effects of our success on this side the river."

On the 9th, Worth's division was put on board of the men-of-war and steamers, and those of Patterson and Twiggs, after filling up such vessels of the squadron as were not occupied by Worth's, were put into transports, which were towed by the steam vessels of the fleet.

The expedition, advancing in the above order, arrived about noon at the selected spot; the surf boats were immediately filled by the troops of Worth's division, which, upon gaining the beach, formed and marched forward to the sand hills, where they took up a position to protect the operation from any attack of the Mexicans.

The surf boats continued their trips with alacrity, and before next morning the entire army was established on the shore.

The landing of materiel and baggage continued without interruption until the 12th, when a heavy norther sprung up, causing such a surf that the operation had to cease entirely; this norther blew constantly (except a lull of a few hours on the 13th) until the 17th, when it abated, and the landing of stores and artillery was recommenced; the whole of the army materiel was not, from this cause, got on shore till the the 24th, having been interrupted the third time on the 23d.

The army in the meantime had advanced on the city and completed the investment of it; a parallel and several batteries had been constructed, and on the 22d the bombardment commenced; the city was overwhelmed with shot and shell for four days, when its governor offered to capitulate.

Thus in eighteen days from the time the expedition anchored off the beach it had accomplished the preliminary and all-important measure of the campaign.

The Mexicans were deprived of the strategetical advantages which were offered by the fortress both in its character of a retreat for troops and harbor of refuge for privateers; the army also gained a secure base of operations, and was enabled to march on the capital by the paved road which leads to it from Vera Cruz.

In this descent an army of about 12,000 men was landed on an open beach, exposed to the most violent winds, and only three miles from a fortress and castle of the enemy. The landing of the provisions, artillery, and baggage was repeatedly interrupted by severe storms, but in spite of all these difficulties the expedition achieved, in a little over two weeks, a success which had been pronounced an impossibility by foreign military critics.

CHAPTER IV.

CONCLUSIONS.

A few important general conclusions may be drawn from the facts of Chapter III, and from the accounts in history, of the descents made prior to 1400.

It appears that the seas have never proved a sufficient barrier to the aggressive spirit of powerful maritime states, even when the art of ship-building was comparatively in its infancy, and almost before the science of navigation came into existence; and that, when the compass was still uninvented, not to speak of the epochs when oars were the only propelling force employed, formidable expeditions, both as to numbers and equipments, have crossed seas and oceans, and have landed successfully on hostile shores.

In proportion as successive improvements in the construction of vessels have diminished the dangers which such invasions must hazard, before the debarkation has reduced the chances against them to the usual ones of land warfare, there appears a constant tendency in maritime nations towards exerting more of the national integral strength in this sort of warfare, and also a more frequent resort to it, both in schemes of conquest, and as a means of distracting the enemy from the land warfare in which he may be simultaneously engaged.

The constant communication of an invading army with its ships, and by means of them with its own country, appears to be essential to the prosperous issue of these expeditions; and the chances for fulfilling this condition of success are directly influenced, like the probabilities in favor of a satisfactory landing, by the nature of the vessels at command—their sea-worthiness, speed and size, as well as number. Accordingly there can distinctly be traced, in the History of Maritime Expeditions, an increased probability of the success of the latter in proportion to the improvements in ships and navigation.

If these views are strongly sustained by the events of trans-oceanic warfare previous to the invention of steam, they are proved to be correct beyond dispute by the almost incredible impulse which that motive power has given to the aggressive spirit and military preparations of France, England, and Russia. Steam has done as much towards aggrandizing the aggressive strength of France and England, and the distances at which they can exert it, as the invention of the mariner's compass did towards enlarging the area of navigation.

Without much exaggeration it may be said that steam has so contracted and bridged the Atlantic that we are ten days march from England and two from Halifax ; but, if this expression conveys a fair idea of the speed and certainty of the voyages of steam fleets, it is inadequate to represent the ease with which the journey is performed by the troops, and the facility with which the baggage and artillery are transported.

The Atlantic telegraph, also, whenever it is made serviceable, will be of immense advantage to the British. The intended movements of our squadrons can be indicated in England simultaneously with their departure from our ports, and the operations of their fleets or expeditions directed against them; or our sea-board cities can be guided from home with a double advantage as to time.

It may be said that the arguments I adduce only prove that our navy should be increased; but we must view the case as it is. Our navy is not only insignificant in size compared to those of France and England, but is likely to continue so.

Even, however, if it were equal in size to those of our rivals there would be enough for it to do in distressing our enemy's commerce and fighting his squadrons on the high seas, without leaving any force to spare for the passive defence of our coasts.

Besides, is not England, with her immense navy and powerful channel fleet, in constant apprehension of a descent by the French? Did not Wellington repeatedly caution the government against the dangers of invasion?

It seems certain that the chief difficulty to be provided for by the French, in their plans for invading England, is the uncertainty of keeping up the communications of the army landed, with home. This is, as before remarked, very necessary, both for supplying reinforcements and against the contingency of a retreat.

The isolation of the invading army, and the impossibility of its making a retreat in case of failure, are therefore staked on the issue of a naval battle; and it is fair to presume that it is this risk which delays the order for the execution of a design which must be cherished by every French soldier and sailor.

In our case, however, this dissuading reflection is wanting to preserve our coast from insult; but the reader will need no assistance in making up his mind on the point immediately in question if he will glance over the subjoined condensed account of the British and American navies.

Indeed, there seems to be no necessity for insisting any further, even upon the main case which I have endeavored to make appear.

The conclusions that an unprejudiced reader of the account in question will arrive at, with regard to the military attitude of this country, cannot fail to be identical with those which I have, to the best of my ability, advanced and supported.

On the one hand there is given, in a late number of the Washington Union, the following statement of the United States naval force on active service.

Active service.

Line-of-battle ships	10	None serviceable.
Frigates	10	3 serviceable.
Sloops	21	All fit for active service.
Brigs	3	All in service.
Schooners	1	Useless.
Screw steamers, 1st class	6	5 ready for service.

Screw steamers, 1st class	2	Building.
Screw steamers, 2d class	6	1 serviceable, 5 building.
Screw steamers, 3d class	4	Inferior.
Screw steamers, 4th class	1	Inferior.
Side-wheel steamers	7	Effective.

Actual available force.

Frigates	3	150 guns.
Brigs	3	16 guns.
Sloops, screw	1	13 guns.
Paddle steamers	7	39 guns.
Sloops	21	388 guns.
Frigates, screw	5	172 guns.
Light screw	2	11 guns.
	42	789 guns.

Thus it will be seen that the government is prepared to send to sea at once, in case of war, only 42 vessels, sail and steam, of all classes, carrying 789 guns. In addition to these, it has at disposal 5 or 6 small steam vessels in the revenue and coast survey service, none of which, however, are fit for war purposes, except the Harriet Lane, a new paddle cutter of 650 tons.

On the other hand, the British navy is described as follows:

Great Britain has some 90 vessels of the line, carrying from 72 to 190 guns, the majority of them screw steamers. Her sailing vessels of the line are most of them in disuse, being used for receiving, store, and transport ships. Her screw propellers of this class carry long 32's and 8-inch guns, and one 10-inch pivot gun. She has some 30 large screw frigates, carrying heavy guns, most of them 8-inch. She is also building a class of steamers, several of which are in the water, designed to cope with our own new vessels of the first class.

Her present class of screw sloops are large vessels, of from one thousand two hundred to two thousand tons, carrying from twelve to twenty-four heavy 8-inch guns, with one pivot gun. She has about two hundred and fifty light steam vessels, all screw, divided as follows: Despatch vessels of six hundred and fifty tons and three hundred horse power each, carrying two or four 32-pounders and two pivot 8-inch guns; a class of vessels of about four hundred tons and one hundred horse power, carrying two howitzers and one 8-inch pivot.

Her third and most effective class of vessels are small screw gunboats, ranging from two hundred to three hundred tons burden, with from twenty to sixty horse power, carrying a light 8-inch gun or long 32-pounder and one or two 24 or 32-pound howitzers. Besides these she has between forty and fifty paddle steamers of various sizes: from the Terrible, of one thousand eight hundred tons and twenty guns, to the Pigmy, of fifty tons and one gun.

From this statement it will be seen that if she has men to man them, Britain can place thirty screw steamers of the line, twenty

screw frigates, forty screw sloops, and one hundred and fifty lighter steam vessels on the Atlantic coast, without decreasing the strength of any one of the fleets on other stations, and still have a large force to hold in reserve. In this enormous navy we find combined, to an almost incredible extent, the main requisites which I have shown to be essential to the success of naval military expeditions, viz: rapidity and precision of manœuvres and of combinations, as well as of voyages; speed and certainty of communications, and capacity and concentrated power in the vessels.

CHAPTER V.

On reviewing hastily the four chapters just concluded the following points will be found to have been incontestably established:

1. That the United States being, above all the powers in the world, in a condition to defy any other sorts of attack, will be, in any future war, subjected to a series of naval-military expeditions which shall have for object the destruction of the government naval establishments and the ruin of our commercial cities.

2. That these expeditions will be on a most immense scale, and formidable, as well from the late scientific and military improvements in warfare, as from the numbers of the troops and the rapidity and certainty of the descent.

3. That these expeditions will follow immediately upon the declaration of war, be simultaneous with it, or even be themselves the only announcement of hostilities, may be inferred from the usage of nations, and of Great Britain especially, during the last 50 years.

4. And, lastly, it will certainly happen that those of our seaboard cities will be first attacked which offer the richest prizes, and which it would affect the country most to ruin (commercially or materially) and which possess the least capacity of resistance.

5. These expeditions may be of an entirely naval character* or they may be descents in which the fleet would co-operate with the land forces, either offensively or merely as forming and protecting the communications and retreat† of an army of debarkation; or it may serve in both of these capacities.‡

It is against attacks of our seaports by fleets alone that the seacoast fortifications of the United States are intended; this appears from the nature of the works themselves, which are mostly stone castles looking upon entrances§ to harbors, or on roadsteads, where they merely prevent an enemy's fleet from effecting a rendezvous or taking shelter or making their station‖ for blockading purposes. This, also, is the theory which is stated expressly in the written reports of the Chief Engineer of the army, and it is especially laid down in the assemblage of letters by several of the highest officers of the Engineer Corps, which is to be found in General Totten's Report on the National Defences of 1851.

6. I therefore propose, as a supplement to the official system of American fortifications, a plan for defending the seacoast cities from naval descents, of which the essential features are—1st, the use of

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* Such as Bonaparte's expedition to Egypt; French attack on San Juan de Ulloa; attack on Copenhagen in 1801 by Nelson and Parker; projected attack on Cronstadt; bombardments of Odessa and Kimburn.

† Pakenham's and Washington expeditions.

‡ Sevastopol, Bomarsund, and Kertch.

§ Fort Warren, Fort Sumter, Fort Delaware, Fort Richmond, Fort Schuyler.

‖ Castle Calhoun, fort at Sandy Hook, Fort Taylor, and fort at Ship Island, Fort Jefferson.

fortifications of a cheap description and adapted to the range of the Minie rifle or its equivalent, the new regulation United States rifle musket; and 2d, that the main reliance, in the defence of these works, is the militia and volunteer regiments belonging to the city which may be attacked.

The city of New York—with its great material wealth in private and public buildings and stores, its navy and ship yards, its factories, machine shops, and foundries, and its other workshops of all kinds—is, in itself, a worthy object for a grand expedition; but the incentives to an enemy to attempt such an enterprise would include, besides, the hope of paralyzing, to a certain extent, the trade of those great districts of country, of which New York is the commercial centre.

But although the loss to the country in general which would spring from the bombardment and conflagration of New York would be severe, (the manner in which that event would be felt it is unnecessary to explain to practical business men,) I need not dilate on it here; for the readers to whom I address myself are especially New Yorkers, who ought not to need any additional stimulus to interest them in the matter, than the possibility of lasting injury to the city which their boldness, enterprise, and perseverance, have placed first among all competitors on the western continent.

I say lasting injury, for it is certain that the country at large would recover from the shock of a blow struck upon New York much sooner than could the latter, individually, which must remain for a long time a maimed member of the general system; while, to carry out the analogy, the vital streams of trade which now circulate through it, being directed into other channels for the time, would so aggrandize the neighboring ports, that their rivalry might be of material hindrance to the restoration of the city in its former pre-eminent position.

The citizens of New York have always shown themselves solicitous for the safety of their port, and in every case where the necessity of fortifications has been pointed out by engineer officers, they have been prodigal of their efforts to secure appropriations for the building of them.

They have done their share towards the work of making the city perfectly secure from all foreign aggression, and it must be with great difficulty that they will listen to the unwelcome assertion that the defences which they have been assured are all sufficient for the purpose are far from being so; that their powerful protection from attacks, in one quarter at least, is an illusion; that, supposing an enemy's army landed on Long Island, the immunity from a bombardment is to follow from certain scientific and strategetical influences (which the fortifications are to exert) which shall deter him from approaching the city by roads which are entirely unprotected.

It will be enough for a man of common sense to be informed that the barriers to an enemy's advance are not *material and visible* for him to despise them; and certainly if an enemy does not see any ahead of him, he will not be as apt, as a less interested party, to listen to an argument showing that it is highly dangerous for him to advance and prosecute his enterprise.

Here is a prize worth more than Sevastopol, Copenhagen, Bomar-

sund, Kimburn, or Kertch, as booty to an enemy; and which would be double the loss to this country that it would profit its destroyers; and it lies as open to attack, from several quarters, as if not a cent had been spent on its defences. A chain is no stronger than its weakest link; and any one opening by which the city can be approached, is as good as two, or three, or as a free entrance in all directions. I will not, at present, discuss the question, whether, or no, the castles which are set on the banks of the water avenues to the city will altogether bar the passage of any foreign fleets and flotillas; but, taking it for granted that heavy guns and mortars cannot be brought *afloat* against the city, will proceed to demonstrate that they can be, and very readily, by an enemy which should rendezvous at Halifax, voyage for forty-eight hours in steam vessels and in transports towed by steam if necessary, and, arriving in Long Island Sound, disembark in one of the numerous harbors of that quiet lake, and march upon Brooklyn with a force of say 70,000 or 100,000 men, and with a train of light mortars and howitzers, by which the entire city would be reduced to ashes by firing across the East river. As an alternative, the city might be required to give up as prizes of war the naval stores and ships-of-war in the harbor, the American merchant ships in port, and furnish, in addition, a contribution of as many millions of dollars as the pressing necessity might make the loss preferable, to the other threatened evils.

CHAPTER VI.

DEFENCE OF NEW YORK AGAINST A NAVAL-MILITARY EXPEDITION.

The Official Theory and Practice analyzed and criticised.

In the report, to the Secretary of War, of General Totten, chief engineer, of 1840, which is substantially repeated, in essential respects, in his "Report on the National Defences," of 1851, we find that the theory of the defence of New York, according to which all its fortifications have been and are to be made, is as follows:

1. To prevent a fleet from appearing before the city and bombarding it; to this end there are a certain number of castles built on the shores of the bay and East river.

At the Narrows are forts Lafayette, Hamilton, and Richmond, and batteries Hudson and Morton. Across the channel, at this point, is to be stretched a strong boom, which shall stop an enemy's fleet, or delay it long enough to give the forts time to cripple or destroy it. A work on the site of Fort Tompkins, and a battery to rake the beach, are in construction. The former is to remedy the ill location of Fort Richmond, and the dislocated arrangement of the whole system on Staten Island.

In second line behind these, on this approach, and close to the city, are forts Columbus and Castle William, and South Battery on Governor's Island, and a trifling work on Ellis' Island. These were originally built to effect all the purposes of the works below; but are now chiefly of value as tending to discourage an enemy from running the gauntlet of the lower works, with the idea of receiving their fire without reply, and revenging himself on the city.

To close the avenue presented by the East river, there are two forts, opposite each other, on Throg's Neck and Willet's Point. (One of these is not yet begun.)

2. To prevent a hostile fleet from taking position in the lower bay, (Sandy Hook bay,) and thence blockading this entrance of the port, a castle is to be built on Sandy Hook.

3. To prevent an enemy from disembarking on Long Island, or on the main land, and marching on the city, with a train of mortars and howitzers, to bombard it, we have nothing but the same works, which are said to effect this purpose, totally distinct from the other, by the following *theory:* To prevent a hostile fleet from landing an army at Gravesend bay, below the Narrows, the (unbuilt) fort on Sandy Hook is supposed to suffice, because it bears on the main ship channel within cannon range. This power of being capable of firing on the enemy's ships while they are traversing the distance of 2 miles within $1\frac{1}{4}$ miles of the fort is supposed, as it appears from General Totten's report of 1856, sufficiently formidable to hinder the conception of the enterprise. Other engineer officers yield the point that Sandy Hook might be passed, if not by day, at least by night, by such

an expedition, or that the fleet, instead of passing by Sandy Hook, might, as urged by Major Chase, take the East, or the 14-foot channel, and arrive at Gravesend bay without coming within range of the fort; but they say that, even if arrived here, the enemy could not land his troops, owing to the fire of the forts at the Narrows.

On the East river, General Totten supposes that the landing would be stopped, or its object frustrated, by the works at Throg's and Willet's Points, owing to the following causes: The enemy would not land on the main land below Fort Schuyler, because he would have more than 20 miles to march on New York, and would have to cross the Harlem river. He would, it is pretended, be prevented from landing on Long Island by the fort on Willet's Point, which has a *strategetical bearing* on his advance on Brooklyn. This is a fair statement; for, in General Totten's report of 1840, we find—

"But should he land on the Long Island side, he might, by leaving parties in suitable positions with a view to prevent our crossing the river and falling on his rear, make a dash at the navy yard, having no obstacle in his front.

"To prevent this effectually, and also to accomplish other objects, a work should be erected at Willet's Point, opposite Throg's Point.

"This work * * would involve a march against the navy yard from this quarter in great danger, since all the forces that could be collected on the New York side might, under cover of this work, be crossed over to Long Island and fall on the rear of the enemy, *cutting off his communication with the fleet.*"

In short we have the works of New York built on the following theory:

1st. To stop fleets from sailing up to the city, forts, castles and batteries, which oppose the passage by their fire, and which are to be aided by the material obstacle of booms stretched across the water.

2d. A work to prevent a fleet from making a resort of Sandy Hook bay.

3d. To prevent an expedition from marching on the city, after landing on the main land below Throg's Neck, the natural barrier of the Harlem river is to be defended by troops in the field.

4th. To prevent an expedition from marching on the city, after landing on Long Island, below the work on Willet's Point, reliance is placed *entirely on his fear of attacks on his rear* by troops issuing from that work.

5th. To prevent a landing in Gravesend bay, within 10 miles of Brooklyn, it is supposed that the fleet must pass within range of a projected, but yet uncommenced, work at Sandy Hook, and that it would be deterred from doing so by fear of the damage it would sustain. And I will here add the opinion of individual officers, that, even if it did pass, the anchoring and landing in Gravesend bay would be so cannonaded that the operation would be impossible.

The above is a fair and accurate exposition of the entire system of the fortifications of New York.

It has always, however, been considered by some eminent officers of the corps that the system is faulty in theory, and it is so, in my opinion, both in theory and execution.

Avoiding discussion for the present of the first three points, let us consider the fourth and fifth, to which this memoir relates.

It has always been asserted by Major Chase, and by the late Major Sanders of the Engineer Corps, that a landing in Gravesend bay is perfectly practicable; the sailing past Sandy Hook at night by the large ships is easy enough, and the losses would be far from checking the progress of a powerful fleet of vessels, capable, as ships-of-the-line and frigates are, of receiving a great number of shots, and sustaining the fire of forts for hours. Smaller vessels can enter New York bay by the East channel, which does not lie within range of Sandy Hook, and gun boats can pass within a stone's throw of the point of Coney Island. But this main ship channel might, as Major Chase insists, be avoided altogether; for, provided the expedition were altogether conveyed in light draught vessels, it might take the 14-foot channel, which leads to Gravesend bay, without passing under the fire of Sandy Hook ; there is, indeed, no doubt of the practicability of either of these passages.

As to the anchorage and beach of Gravesend bay being within and under the fire of the works at the Narrows, that would appear, if so, to be an accidental circumstance, from the following considerations: Fort Hamilton, the nearest one, is built in a hollow, and is prevented by a ridge of land, which lies between it and Gravesend bay, from seeing the latter, except from the upper or barbette battery of the side which bears upon it; now, this side, like the side fronting on the Narrows, is casemated, and its scarp wall is pierced with embrasures for guns, so that if the fort, identically as it stands, had been built on top of the said ridge, a hundred yards to the southward of its present site, instead of behind it, there would have been, in addition to the nine or ten barbette guns that can now be directed on Gravesend bay, a complete tier of guns in casemate, which latter have always been valued by the Engineer Department at a much higher rate than guns in barbette. As, however, this advantage, which, at a time when bomb-proof floating batteries were unknown, was really of great importance, was neglected, for no sufficient reason, and for no cause, as far as the shape, construction, or cost of construction of the work was concerned, we must conclude that the action of Fort Hamilton upon Gravesend bay, as prohibiting or interfering with debarkations, was not an element of the design of the fort.

This view is strengthened by considering, that, when the fort was built, our largest guns were 32 and 42 pounders, with an extreme range of about 1,900 yards, obtained with the maximum charge and elevation ; now, if the work were furnished only with an armament of these, the farther beach of Gravesend bay would be a mile beyond the range of its guns, even if it were seated on the ridge above-mentioned.

Another argument in support of the opinion that the works at the Narrows were not originally intended to prevent debarkations on Gravesend beach is to be found by examining Fort Lafayette, which stands just in advance of Fort Hamilton, on a shoal in the Narrows.

This fort is square, and one face has a view down and one up the Narrows ; an angle is thus left bearing across the Narrows, so that its

guns cannot be directed square across; this is probably because of the works in that quarter on the opposite side, which might otherwise be in danger from chance shots from this work; but another angle bears nearly towards Gravesend bay, and thus no guns could be mounted, except the two in the angle itself, having a bearing in the necessary direction to interfere with a debarkation on its beach, and what renders this view still more evident is that the face which bears most directly on the said beach is not provided with embrasures for cannon, but is merely *loop-holed for the use of musketry.*

As to the redoubt behind Fort Hamilton, one face of it sees the bay, but it has no more guns on the side which bears in this direction than on either of the other three, viz: three guns, one at each end of the face, and one in the middle, the redoubt mounting in all 8 guns.

If, to get General Totten's opinion on this subject, we consult his "Reports" of 1840 and of 1851 to the Secretary of War, we find the following recommendations, which relate directly to it. In the first place, he recommends the construction of works, one on the east bank, a shoal to the eastward of the channel, and one on another called the *middle ground*, as "an outer barrier at the very mouth of the harbor:" to prevent access to the inner harbor, and thus to render a close blockade of the harbor impossible, and obliging an enemy, disposed to debark an army, to land at or near Rockaway, on the beach exposed to the ocean and storms.

He says expressly, that without some "outer barrier" of this sort, a squadron would land a force on the beach of Gravesend bay, within 7 miles of the city of Brooklyn, of its commanding heights, and of the navy yard, with no intervening obstacle of any sort.

"This danger is imminent, and it would not fail, in the event of war, to be as fully realized as it was during the last war, when, on the rumor of an expedition being in preparation in England, 27,000 militia were assembled to cover the city from an attack of this sort. It is apparent that the defences near the city and those at the Narrows, indispensable as they are for other purposes, cannot be made to prevent this enterprise."

General Totten subsequently admits, that there is great doubt whether the shoals mentioned are stable enough to warrant building upon, and says that "all other means failing, works may be erected on Sandy Hook, which will have a *good action* on the channel, and under cover of which bomb-ketches, or steam batteries, or both, may lie.

"With such an arrangement, there would be little probability of the lower bay being occupied as a blockading station."

To sum up, General Totten substantially admits, 1st, that the works at the Narrows will not prevent a landing at Gravesend bay;

2d. That it requires works that shall close the exterior mouth of the harbor, to prevent such a landing;

3d. He proposes to do *what he can* towards this by a work at Sandy Hook.

Now the East channel runs in a convex line with regard to Sandy Hook, and its nearest edge at the closest point is 6,000 yards from it, or a mile beyond any possible range of our heaviest ordnance.

This channel is deep except where it crosses the bar, where there is, at low water, always 19 feet.

By this channel, transports could enter freely, even supposing the fort at Sandy Hook built, while their protecting fleet of liners and frigates could either enter at night or hastily by day, by the main ship channel.

According to General Totten's own showing, therefore, the landing at Gravesend bay, is a thing to be expected in our next war.

It is worth while, however, at this point, to endeavor to ascertain for ourselves how the case really is: whether the forts at the Narrows can prevent a debarkation in Gravesend bay or not; and this will not give us much trouble since we have only to consider the distance of the forts from the anchorage and beach, and compare this with the distance that the heaviest guns in our service will carry.

Forts Hamilton and Lafayette are the nearest works to Gravesend beach, lying on the same side of the Narrows: the distance from these to the point of Coney Island, which is the nearest part of the further half of the beach, is $2\frac{3}{8}$ miles, while it is $2\frac{7}{8}$ miles to the furthest part of the same half, which is the edge of Coney Island itself; so that there is a quiet landing place of some two miles in extent, none of which lies closer to Fort Hamilton than $2\frac{3}{8}$ miles, and the greatest part of which is nearly 3 miles from the same point. As to the works on Staten Island, Battery Hudson, on the side of the high bank which forms a point into the bay, and which is the nearest point of Staten Island to Gravesend bay, is $2\frac{1}{2}$ miles from the further edge of the channel where it passes Coney Island and the entrance to Gravesend bay, and is $3\frac{1}{2}$ miles from the beach of the latter on the near or inner side of Coney Island.

The 10-inch columbiad, with a charge of 18 lbs., and firing a shell of 100 lbs., will carry, at the angle of greatest range, 35°, (see Thiroux, page 351,) as far as 4,828 yards, according to the Ordnance Manual.

But, lately, it has been found that this charge is too heavy for the piece, which is very apt to burst with it; and by a recommendation of the Ordnance Board, approved by the Secretary of War, the charge for 10-inch columbiads is restricted to 14 lbs. at the utmost, with the additional restriction of not firing solid shot from them.

Likewise, the 8-inch columbiads are restricted, by this regulation, to charges not exceeding 8 lbs. Their maximum charge was formerly 15 lbs., which, with a shell, and at the elevation of $27\frac{1}{2}°$, gave a range of 4,468 yards.

What is the diminution of range that follows from a reduction of the charges of 10-inch and 8-inch columbiads, respectively $\frac{1}{4}$ and $\frac{1}{2}$, (nearly,) I am not able to say; but we may suppose that it will not be less than $\frac{1}{5}$ and $\frac{1}{4}$ of the ranges of the respective pieces.

This will fix the maximum range of our 10 and 8-inch columbiads at 4,225 and 3,351 yards, or in other words, they will not carry as far as $2\frac{1}{2}$ or 2 miles, respectively.

It must be recollected that there is, with these ranges, owing to the elevation, *no ricochet;* and, also, that there is no sort of accuracy of

fire at high elevations. On this point, Sir H. Douglas says that, "elevation is, inversely, the exponent of accuracy."

At 2½ miles from the battery, therefore, an enemy's vessel cannot be reached at all; and for, say, a half mile inside of this distance, she runs very little risk of being struck.*

Now, the distance from Staten Island to the further side of the main ship channel, where it passes in front of the anchorage of Gravesend bay, behind Coney Island, being 2½ miles, and it being 3½ miles to the shores of the bay, it is a matter of certainty that the largest men-of-war can come to an anchor, in a line parallel to the shore in question, and protect the landing of an army by their heavy guns, being themselves out of the reach of army annoyance from the batteries on Staten Island, and in perfect safety also from storms; the shallower waters of the bay would admit all sorts of gunboats and light draught vessels, and the launches, &c., of the men-of-war.

The large vessels lying, as supposed, opposite Coney Island would also be 2½ miles from Forts Lafayette and Hamilton, and consequently out of the range of their guns, while the gunboats, flatboats, or launches used in the debarkation, could land the troops, all along the inside sheltered beach of the island, without running more than a trifling risk. This would occur in passing by the point, which lies just inside of the extreme range. Immediately beyond this, however, the beach retreats so as to be altogether out of reach. In short, the debarkation of a foreign army at Gravesend bay is at this moment entirely feasible.

After the pains to which I have put the reader that he may convince himself of the fact that a debarkation on Gravesend beach is easy, and not to be greatly incommoded, much less prohibited, by the fire of any existing or projected fortifications, he will be surprised to learn that, even if the beach in question were under the fire of some of our works, or if from any other reason there should be objections, on the part of the supposed expedition, to the landing of the army upon it, there are *equal facilities for the latter, out of sight, as well as out of range, of all our forts upon the outer or seabeach of Coney Island.*

To explain this, I must briefly describe the lower bay of New York, which is not to be judged of (except by persons used to the sea) by looking at the charts.

This lower bay is an immense sheet of water, which has the shape on the map of on equilateral triangle, with sides of 15 miles each, the points being at Amboy, the Narrows, and the Highlands. Two sides are bounded by Staten Island and Jersey; while the third side, which lies due north and south, is partly limited by Coney Island and by Sandy Hook, opposite each other, while the intervening space of 7 miles is open, APPARENTLY, to the ocean.

I say apparently, because "THE BAR," which is at two places dry at low water, stretches entirely across the space, which, lying between Coney Island and the Hook, seems to admit freely the waves of the Atlantic.

There are several channels across the bar, by which vessels find an

* While on this subject it may be noted that these facts show that the 10-inch seacoast mortar is equally effective in range and accuracy with the columbiads.

exit, more or less round about, according to their draught of water; the heaviest class being obliged to follow down along the inside of it, in a due southerly course, till they come nearly opposite the Hook, when they turn suddenly square to the east, and so stand out to sea.

The track thus followed by the heaviest vessels is called the main ship channel, and it is, and is constantly being used, as a harbor; vessels of all sizes anchor in it, and it is considerably smoother in easterly weather than the regular quarantine anchorage off Seguine's Point, because the latter, which has the same shield from the waves, namely, the bar, is more remote from it.

In an east or southeast gale there is, on the east bank, (which is that part of the bar which stretches three miles from Coney Island without any channel, and which is, at one point, bare at low water,) a continuous line of breakers, which are so violent that they can be seen dashing and throwing up foam, from Fort Hamilton; and the force of the sea is thus altogether spent, so that on the inside or west of the bank there is no more than a regular swell, in which vessels of all tonnage can safely ride at anchor, especially as there is good holding ground of mud and sand.*

The only difference that would be felt by this harbor, if Coney Island, instead of the east bank, sheltered it on the east, would be, that it would be protected from the force of the wind as well as waves; but, with good holding tackle, the wind can do no harm, and a vessel properly provided with it can lie behind the east bank as safely, if not as comfortably, as in the North river.

The landing would be, of course, effected in fine weather, (and there are, indeed, few days in summer when the weather is heavy enough from the eastward to prevent,) and might take place with perfect safety on the outer beach of Coney Island. Along this beach there are no breakers in moderate weather, and the swell is mostly stopped at the outside of the east bank, so that flatboats and launches could make short and easy trips between the ships and the shore.

The whole operation would be entirely out of the reach of the guns of any of the forts, and the beach itself is hidden altogether from the latter by the row of sand hills which form the high part of the island.

There is, therefore, a certainty that a foreign army can be debarked on the outer beach of Coney Island, and that it may maintain communication with its fleet, (the latter having a safe anchorage,) and with Halifax, Bermuda, or England, by means of the 14-foot and the East channels, without possible molestation from any works that are now built, or that have been projected or named by the Engineer Bureau.

But the peril from another quarter is still more evident, and there is, if possible, still less to say for the official theory of the defence.

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* This reference to storms must not lead to the impression that they are to be expected in summer weather, which is the time when an expedition would probably appear off our coasts; on the contrary, the whole season may pass without a single violent gale; but I have said enough to show that even the worst weather would not damage a hostile fleet which should station itself just below Coney Island, to land an army, and to keep up communications with it and the sea.

Long Island Sound is practically an immense roadstead, and on the Long Island side there are smaller bays and harbors which offer every facility for landing troops and stores.

Such are Smithtown bay, Huntington bay, Oyster bay, Hempstead harbor, and Manhasset bay, at 40, 30, 20, and 15 miles from New York, respectively.

It cannot be denied, and in fact it is essentially taken for granted by General Totten himself in the report (of 1840) that a landing may be expected in one of these bays.

What, then, is to prevent the enemy from marching on Brooklyn? Nothing according to General Totten's plan, unless the commander-in-chief of the expedition has his head so filled with obsolete military science, that he will not "leave a fortress in his rear."

It is entirely to the chance of the hostile expedition being commanded by a man who has notions exploded sixty years ago by Napoleon, that New York depends for safety.

Should nothing more be done than I have been able to find recommended officially to check such an expedition, we will have as a consolation for the plundering and destruction of the cities of New York and Brooklyn and the navy yard, the honest but fruitless justification of the Austrian, Melas: "This Bonaparte violates all the rules of scientific warfare."

CHAPTER VII.

CONSIDERATIONS BEARING UPON A NEW DEFENSIVE PLAN.

Something more effectual than is yet proposed by our Chief Engineer is requisite to stop the approach upon New York of a great military naval expedition, with all the appliances of modern war, and counting its 50,000 or 70,000 men.

That we must be prepared for such a contingency cannot be denied in the face of the facts and numbers of Chapter III, and it follows that it is proper to decide at once what is the plan which shall offer us the most chances of success in the short but severe campaign which we may soon, perhaps, be engaged in, in the protection of the soil, of our commerce, our public works, and our dwellings, from the fate of Washington and Copenhagen.

In arranging such a plan of action we must consider:

1. The nature of the army that is to be resisted;
2. That of our own troops;
3. The topography of Long Island, including the probable landing points; the line of march of an invading army, the positions to receive the attack in;
4. The choice of positions for the defence, and the manner in which localities may be taken advantage of to increase the chances in our favor;
5. Finally, the best manner of combining artificial, permanent, and field works with the natural advantages of ground, so as to attain enough strength without excessive expense.

An attempt to depreciate the citizen soldiery of America, her best safeguard, would be as incompatible with my feelings as it is remote from my intentions.

I need not be reminded of the victories that our militia and volunteers gained in the late war over veteran troops, recently drafted from the splendid peninsular army of Wellington; nor of their successes in Mexico, which rival in daring and romantic brilliancy the exploits of the soldiers of Cortez, and which they did not decline to purchase with losses almost unparalleled in warfare.*

What our citizen troops have done, they can perform again. Such armies as were victorious under Jackson, Scott, and Taylor, are undoubtedly competent to meet in the field any foreign ones of equal force.

But our history offers no precedent of engagements between armies of European proportions; and the experience of other nations proves, that in proportion to the numbers engaged, discipline and unity of action become more and more indispensable to success. When bodies of 50,000 or 100,000 on a side meet in the open field, individual bravery, even when stimulated by patriotism, is less to be prized than perfect mutual and reciprocal confidence between the troops, their officers, and their commander; and this cannot be infused at once into an army, but requires for its development years of active service, which perfect each man in the knowledge of his duties, give him the

* I refer of course to the proportion of the killed and wounded to the number of troops engaged.

habit of implicit obedience, and confirm his respect for his superiors.

It is, no doubt, by this principle that Wellington would have justified his boast that, "with 70,000 such troops," as he commanded in the peninsula, "he could go anywhere and do anything."

History offers examples where armies, not wanting in courage, have found their very numbers a disadvantage in battle, and the occasion of immense losses in retreat.*

The British and French troops of the present day are not inferior to any that have been heretofore opposed to our arms. Their campaigns in India, Algeria, and the Crimea, have tempered them to the highest pitch of efficiency.

As to numbers, it is reasonable to count upon a hundred thousand such being thrown at once upon our coast; while in point of arms and equipments, we may expect that an invading expedition would be amply provided; for their recent experience has shown our rivals exactly what is needed, and in what quantity, in undertakings of this sort.

If we fancy such a force, fresh from the ships, with their arms, clothes, and shoes in good order, and with only a day or two days' march to perform in order to behold their point of destination, stimulated too by the promise of plunder and prize money, we have surely a picture calculated to excite uneasiness, and give us cause to cast about for the most certain means of safety in such an emergency.

In calculating beforehand the chances of a battle, there must be considered not only the probabilities of victory, but the result to be derived from it, and the consequences of defeat.

If in the battle which will perhaps decide the possession, for example, of Long Island, our arms should be successful, the fruits of victory, beyond the glory acquired, would be of a negative kind, being limited to the keeping of what we have already got; for the losses would be about equal, and the enemy's ships would receive his beaten troops, and protect by their broadsides their embarkation. If, on the contrary, our troops should be beaten, there would be no possibility of preventing the enemy from advancing without delay to Brooklyn heights and the shore of the East river, and there erecting a few mortar and howitzer batteries, with which to either burn down New York, or compel the alternative of a ransom that would impoverish the city; as to the navy yard, it would be a fair object for destruction.

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* Take the battle of Narva, for instance, in which 80,000 Russians, behind entrenchments, were beaten by the advanced guard of the army of Charles XII, composed of 4,000 cavalry and 4,000 infantry, or 8,000 men in all. The Russians lost in this battle 18,000 men in killed, besides a great number who were drowned in attempting to retreat over the bridge of the Narva; their left wing, also, which had not been engaged, laid down its arms the next day when the Swedes prepared to attack it in turn. Charles thus made 30,000 prisoners, but he contented himself with ordering them home.

Charles had landed with 20,000 men; but was so impatient to raise the siege of Narva, that he pushed on with his best troops, routed three Russian corps on the way, and on the third day appeared before the Russian lines. His artillery immediately played upon and breached the earth-works on the right, when he led his fatigued troops, after a short test, to the assault. Voltaire gives the Russians of that time the same character for bravery that the Eastern war has since rendered indisputable, and attributes this defeat to their want of discipline and the habit of warfare.

In a word, an American defeat on Long Island would involve the greatest misfortunes that could occur to New York and Brooklyn; while, on the other hand, a victory would be rewarded with no substantial and material gains.

In this game, where the stakes are so disproportioned, we should at least endeavor to have great odds in our favor.

If, therefore, we could even calculate on opposing to a foreign army, landed on Long Island, a force equal in numbers and discipline, or which should make up in numbers for any inferiority in discipline, it would still be desirable to favor our troops with every advantage that can be derived from fortification; and if the aids of the engineer are not to be disdained in this hypothesis, how much ought they to be prized in the actual case; for it is certain that we shall never see a disciplined American army of 80,000 or 100,000 men, on Long Island; and it is equally true that no number of raw troops that could be collected on the island would be a match, *in the field*, for 80,000 or 100,000 veteran troops.

Considering that the maintaining of large regular armies is prohibited by the nature of our institutions, it happens fortunately that imperfectly disciplined troops are so well adapted as they are to the defence of entrenchments and fortifications: indeed, in this sort of warfare, they have, in many instances, surpassed regular troops, in obstinacy and devotedness.

Irregular or undisciplined troops in large masses fail in the field because such is the natural course of events; but place the same men behind entrenchments, or otherwise, in such a manner that the duty of each consists in defending his post, and you eliminate from the adverse chances all those which follow from the impossibility of using the army on the battlefield like a tremendous machine; concentrating at one point, perhaps, and feigning retreat at another—extending or contracting the order of battle, surrounding, outflanking, or surprising the enemy—in short, if irregular troops, composed of brave and good marksmen, do not defend entrenchments against odds, even of the best soldiers, it is the fault of the entrenchments, or of the manner in which they are disposed in them, or of their commander.

It has, therefore, been the custom of generals in command of raw levies, to accustom them to war, by engaging them constantly in small affairs; or, if compelled to accept battle, to select a strong position that cannot be attacked except in front, and entrench it as much as possible; in arranging the troops care is taken to obviate the necessity of changing materially their posts during the engagement.

The general who is charged with the defence of Brooklyn will, therefore, look about him for a favorable position, which shall, besides offering facilities for fortification, be situated directly in the path of an enemy, landed on any probable part of Long Island, and which cannot be outflanked.

This selection involves of course a thorough personal examination of the general features of the coast, its harbors and beaches, and with the topography of the island, its hills, plains, and roads, its towns and villages, from one end to the other.

PART II.

CHAPTER I.

DESCRIPTION OF LONG ISLAND.

Long Island is about 100 miles long; its outer or southern shore is a sandy beach, protected from the direct effect of easterly storms by keys, or sandy strips, which inclose between themselves and the main land extensive bays; these last, though shallow, have some deep channels, which permit small coasting vessels to navigate them. The largest of these bays are Jamaica bay, Great South bay, and Great West bay.

On the north shore we see, instead of level sandy plains, bounded by bays of the south side, high bluffs or grassy hills, with clean gravelly beaches at their base; the general line of shore is indented by several safe and extensive harbors, which admit ships of the largest class. The principal of these are Huntington and Oyster bays.

The whole sound may in fact be regarded, as far as large vessels are concerned, as one harbor, for there is good anchorage and plenty of water throughout it, and it hardly ever happens that there is in summer such a storm on it as to oblige vessels to seek shelter; besides, when such is the case, shelter can always be obtained by running across the sound to the windward side of it, and anchoring under the lee of the land.

The eastern end of the island is forked, and the broad expanse between the two points, Montauk and Oyster Pond, is so protected by these and by some islands, that there are numerous safe bays and harbors.

Gardiner's and Peconic bays, with Sag and Fort Pond harbors, are the principal of these.

To describe Long Island with regard to the facilities it offers for a landing by a foreign army, it may be said that in the summer months a landing is practicable everywhere round its shore. In case of severe easterly weather, which may be looked for in winter, and occasionally in the spring and fall, the outer beach is covered by breakers, and the inlets into the bays on this side are dangerous to enter; but in all weather, except north, northwest, and northeast storms, which need not be expected except in the fall or winter gales, a landing can be effected on the north side; and during these gales, when we will suppose a fleet separated for a couple of days from its land force, it can find shelter, within a short distance, under the north shores of the sound, whence it can return and resume its communications, with the force debarked, the same day that the storm ceases.

As to the east end of the island, the facilities are perfect for landing and keeping up communications with the force landed, except in extraordinary weather.

At the west end, Gravesend bay and Coney Island offer every facility for debarkations; but of this a practical proof was given us in '76 by the British, and I have before discussed their capacities.

The topography of Long Island needs but a short description.

A chain or ridge of hills runs from Gravesend bay to Oyster Pond Point. These hills are perhaps from 130 to 170 feet high, with well wooded or grassy slopes. The hills are of gravel, with some clay.

On the north side the slopes of the hills descend, covered with green, to the waters of the sound; at their foot is a narrow beach of sand and gravel, which goes off suddenly into deep water.

At a few points the hills have been undermined by the waves, and present steep gravel banks with boulders at their base.

On the south side the hills terminate in a fine undulating plain, which becomes flat and sandy as it approaches the ocean.

The only exception to this rule is at Great West bay, where a range of low hills commences, and continues so as to form the eastern fork of the island, which terminates at Montauk Point

The farms on Long Island are, on the average, of a fair productiveness, and these would no doubt be taxed to the utmost to aid in the support of a foreign force occupying the island.

The topography of Long Island is therefore such as to lend itself easily to all sorts of military operations and manœuvres, and the roads which traverse the country, especially the longitudinal ones, favor the latter to a considerable degree.

Thus we have the Long Island railroad, which joins Brooklyn to Greenport; and there are numerous plank roads and macadamized and shell roads, all terminating in Brooklyn, and favoring combined concentric marches of several columns upon that city.

The essential facts of a military nature that relate to Long Island may be summed up in a few words: that it is perfectly easy for a foreign army to debark on its shores at any time and march upon Brooklyn, keeping up constant communication with its ships, and supplying itself, to a certain extent, with provisions from the country. The great extent of coast open to attack and the nature of the shores, which are, unfortunately, exposed everywhere to the broadsides of men-of-war, render it extremely improbable that an American army could anticipate and repel the attempt of a grand expedition to debark a land force.

The overwhelming batteries of a fleet, the uncertainty as to the time or place of the attempt, and the harassing nature of the movements of a defensive army which should endeavor to show front to a fleet in all its manœuvres; all these considerations, render it extremely impolitic to trust to the repelling of an attempt to land an army on Long Island. The other alternative is, that of fighting the enemy after he has landed; and a defensive battle is indicated as offering the most chances of success by the nature of our troops and the necessities of the occasion.

If a defensive battle is decided on, it is of the highest importance to

select, in advance, the position on which it is to be fought, and this leads us at once to inquire whether there is any one position which will interdict the approach of an enemy upon Brooklyn, no matter what point of the island he has landed at?

I believe I can indicate a position which not only satisfies the above condition rigorously, but also combines unusual military advantages with the property, of capacity of being rendered almost impregnable by a few permanent works.

CHAPTER II.

DESCRIPTION OF THE DEFENSIVE POSITION WHICH I PROPOSE TO STRENGTHEN BY FORTIFICATIONS.

In order to form a correct idea of this position I recommend the reader to take a "county map of Kings and part of Queens county" and look over it, at the same time following my description of the topography; that is unless he can look at the place itself, which of course a military man would do, if possible, before forming an opinion, or unless he knows it already, as is the case with many New Yorkers, who are in the habit of driving for pleasure over the fine roads which traverse the beautiful district lying between Brooklyn and the seaside.

The large Coast Survey map, in four sheets, of New York harbor and the vicinity, embraces, indeed, this extent of ground; but since this map was made the city of Brooklyn has been built out a great distance. The villages near it have become towns; paved and graded streets are to be found where hills and valleys are indicated in the map; hills have been cut down and low spots filled in; several cemeteries and the Brooklyn reservoir occupy parts of the chain of hills which the map indicates as wooded, &c. In a word, this map is altogether behind the times.

As to the county maps, they omit the delineation of hills, and consequently require to be assisted by the description which follows.

The west end of Long Island is nearly detached from the rest of it by the waters of Jamaica bay on the south, and of Flushing bay on the north sides; these penetrate towards each other so much as to leave only five miles of land between them.

The tract of country which is thus partly detached contains nearly eighty square miles. It is divided into two nearly equal parts by the chain of hills before referred to, which commence at the Narrows and run northeast to about the middle of the space between Flushing and Jamaica bays, where they branch, the highest branch keeping on, and the lower one turning square to the northwest, and following Flushing creek to its outlet in Flushing bay.

To the north of these hills lies the city of Brooklyn, with the towns of Williamsburg, Astoria, Newtown, and Bedford.

Having now sketched the outlines of the picture, it remains to fill in the details of that part of it with which we are particularly concerned.

The range of hills forms an important feature in a military respect, and besides offers an excellent panoramic view of the district lying between itself and the sea, which is the part of the country to which I particularly invite attention.

This range begins with a high hill overlooking the Narrows and Fort Hamilton.

Standing on the summit of this and facing to the right, we look down upon the regular lines of grassy embankment, and the rows of casemate chimneys, which indicate Fort Hamilton; and upon the red streak, which a little closer, but still three-fourths of a mile off, marks the masonry parapet of the redoubt. The purple hills of Staten Island and the intervening glistening strait of the Narrows, form the back grounds of the picture.

Looking directly forward, that is, in a southerly direction, we see a gently undulating cultivated plain, which, with the exception of a slight wooded rise at the village of Bath, on the water side, sinks insensibly to the level of the sea. The belt of blue water beyond, fringed at its shallow edges with brown, which, limiting the plain on the right, extends itself diagonally to the front and left, is Gravesend bay, where the British landed in 1776. The thin strip of white sandhills beyond the bay, and separating it from the sea, is Coney Island. Beyond this again lies a broad strip of blue ocean; the faint line on its surface, which looks like a low beach or island, is Sandy Hook, and the indistinct hills which bound the view and appear to overhang the Hook, are the highlands of Neversink.

Turning gradually towards the left, or eastward, we observe that Coney Island, after it ceases to form a breakwater, protecting Gravesend bay from the breakers of the Atlantic, extends itself far to the east, being separated from the mainland by meadows and marshes, and by a narrow creek.

The view which presents itself, if we turn still further to the left, can be seen to better advantage from our next stand-point, which is more elevated than the present one, and which faces more to the east.

This point is Ocean hill, in Greenwood cemetery, the highest or next to the highest point of land on Long Island; to reach it we will follow the ridge, observing that the latter subsides almost to the level of the plain before we arrive at the limits of Greenwood, and that this cemetry is seated upon the opposite declivity, and is sufficiently extensive to cover the whole side of the hill which culminates at the spot already referred to.

From Ocean hill we can see, in a southerly direction, the Highlands, Sandy Hook, and the ocean, in nearly the same relative positions as they appeared to take when seen from our first elevation; but the view of Gravesend bay and Coney Island is intercepted by a slight rise of land, on which is the village of New Utrecht. Looking easterly, a slight rolling plain is spread before us, reaching so far that we can hardly make out in the distance the houses and spires of Flatlands, and beyond that village the broad expanse of Jamaica bay, flattened into a thin belt; while the sandy key, which separates it from the blue ocean horizon, is almost indistinguishable.

This key, which is called Rockaway beach, stretches almost as far to the eastward as we can see from this point, for there is a high spot on our left which limits the landscape in this direction; we notice, however, that the bay does terminate within the segment of the horizon, which is open to our view, since our attention is attracted by the white hotels at Rockaway, which, reflecting the sun strongly,

look nearer than they really are, and mark where the beach joins the land.

Looking more downwards, we see, close by, the village of Flatbush, which gave the name to the defeat of our troops in 1776, and examining the country in the vicinity more carefully, we distinguish several plank roads leading to Canarsie, Bath, Gravesend, and Coney Island, as well as some country roads.

Quitting Ocean hill, and proceeding still further eastward on the ridge, we shortly arrive at Mount Prospect, where we see the same picture as that just described, from a slightly different point of view; in front, and close by, lies the town of Flatbush; and the passes forced by the British in 1776 are also in sight before us.

As we follow the ridge eastward from Mount Prospect it subsides considerably, and, at the point where it is crossed by the railroad, it is almost lost; immediately to the east of this low place, however, is a high hill, which is occupied by the cemetery of the Evergreens.

A short distance beyond the Evergreens cemetery, and on the summit of the ridge, is the new Brooklyn reservoir, and immediately next to it is a cluster of cemeteries, of which the principal one is that on Cypress hill.

On the highest point of this hill is an observatory, which affords a magnificent view of the entire horizon; ascending it and turning our backs on the North prospect, which embraces the cities of New York and Brooklyn, the North and East rivers, and the noble bay, we see in front a handsome undulating plain, dotted with houses, spreading out till it loses itself in meadows and marshes, which are limited by the waters of Jamaica bay. The village of East New York and the plank road to the town of Jamaica are seen in the foreground.

Jamaica bay, which is rather a network of creeks and islands, is also fully overlooked from this hill; the sand strip which protects it from the ocean, and Rockaway inlet, through which the creeks all issue out, are likewise in full sight, as well as a broad strip of the sea, which alone bounds the view.

Proceeding from Cypress hill still eastward, we find the ridge continuous, and maintaining a considerable altitude; at the distance of three miles, and after crossing the Myrtle avenue and Williamsburg plank roads to Jamaica, we arrive at a summit which deserves especial mention—I refer to the one overlooking the source of Flushing creek, which is a meadow called the "Head of the Fly."

Looking southward from this hill we see the plain limited by Jamaica bay, as in the view from Cypress hill; turning eastward we see the ridge prolonged as far as the eye can reach, but at our feet is a hollow or depression in it, which in a manner divides the range at this point. (This hollow is traversed by the road from Newtown to Jamaica, which last lies three miles off in an easterly direction.)

Turning to the north we see the flat, reedy meadows, and swamps, in which Flushing creek rises; below them, occasionally, the windings of the creek itself; beyond, the waters of Flushing bay, into which it empties, and finally the East river.

The valley down which we have just looked, and which, with

Jamaica bay, more than half cuts the island in two, is limited on either hand by high sloping banks.

The western bank, which is the most important to this description, is admirably adapted for the posting of troops or the locating of fortifications, for the purpose of interdicting the passage of the meadows or creek to an invading army.

For a mile in advance of these heights there is nothing to obstruct a clear view of the creek and its marshy borders, and following the bank down towards the bay we arrive shortly at a hill which lies on this side of a small creek, which may be considered the limit, in this direction, of the position which needs to be occupied to cut off the eastern part of the island from Brooklyn. I propose it for the limit, because here the natural obstacle to an enemy's march, formed by the creek, becomes so considerable, that a position behind it would be strong enough without fortifications, provided it were properly watched and guarded.

If the reader has now gained a good idea of the topography of the west end of Long Island, he will be able to follow the route I will now indicate as traversing the line which I propose to fortify.

Commencing at the abovementioned hill, on the west side of Flushing creek, to proceed up the creek, along the heights which border it and the meadows in which it rises, to the hill above the "Head of the Fly;" here the line goes obliquely down the last named hill, preserving its southerly course, and gaining the plain; it then passes the Union and Centreville race grounds, and joins the marshes of Jamaica bay at a certain creek, near Torbell's landing.

This part of the line I shall call its eastern division. The line now turns an obtuse angle, and runs southwest, along the meadows, till it reaches Flatlands, near Bergen Island; this part of the line is the centre division.

From Flatlands the line turns at another obtuse angle, nearly equal to the first, and runs east to Fort Hamilton, ascending obliquely the lofty hill which is mentioned in the first part of this description.

The whole length of this line is $14\frac{1}{4}$ miles, counting between the extreme points that need to be fortified; and I propose to locate upon the line seventeen permanent redoubts, to be built immediately; the spaces between these to be closed, when the occasion arises, by earthwork entrenchments.

CHAPTER III.

GENERAL DISCUSSION OF THE VARIOUS KINDS OF FORTIFICATION THAT ARE APPLICABLE TO THE DEFENCE OF BROOKLYN.

I have two reasons for incorporating into this memoir the synoptical and analytical description of certain celebrated lines of fortification, which will be found in the following chapter.

In the first place, I wish to prevent unprofessional readers from forming the opinion that my proposition for the defence of Brooklyn is visionary and impracticable, owing to the extent of the line of works of which it involves the construction.

This extent of 14 miles will appear reasonable in every point of view, when, after a perusal of this chapter, the reader shall compare the projected line with the others described; he will find that the former is not only shorter, but vastly more susceptible of an obstinate defence, in proportion to its development, than several famous lines, which have, in both recent and more remote wars, been of the greatest service to generals in embarrassing and perilous circumstances.

The proposition that a given extent of position can be more strongly fortified by the system of works here advocated than by any other which has ever been adopted, except, indeed, the Russian lines at Sevastopol, which are models for study and imitation, (and, to a certain degree, the French lines at the same place,) may be demonstrated by an argument which in brief amounts to this:

The two most essential requisites in lines have always been, as they are at present, the presenting everywhere, to obstruct the advance of the enemy, difficult material obstacles, which shall be rendered as near impassable as possible by the fire of its defenders; (this involves, evidently, the disposing of the troops in such a manner that their musketry shall reach every portion of the space directly in front of the lines.) And secondly, that the troops must not be so scattered along the entrenchments, in order to fulfil strictly the first condition, as to render any point of the line weak, and powerless to resist a violent attack by a large column which should attempt to surprise or storm the works.

These two conditions are now, and have hitherto been, universally recognized, but have been, *owing to the limited range of the musket*, difficult to combine in the same line. Thus we find in history examples where each has been altogether conceded to the other, according to circumstances; among which the most prominent in influencing the general's decision have been the nature of the country, whether inaccessible or level, and that of the troops at his command, whether regular soldiers or undisciplined.

There are also instances of a general's having been enabled, by making good use of the advantages of a position, and profiting by the excellence of his troops, to satisfy both conditions in his defensive arrangements; for when the works can be assailed but from one direction at a time, and, if the troops are accustomed to manœuvres, a suit-

able force can be amassed on that portion which is indicated by the enemy's movements as the point of attack.

But this inherent difficulty, which, in former times, has thus hampered all sorts of schemes for the defence of extended positions, has been dissipated by the invention of the Minié rifle, which, by expanding the range at which infantry fire is effective, in an immense degree, gives the engineer the fullest latitude of conception, and renders easy, both of design and execution, plans which may combine in themselves every desirable defensive property, and which are adapted as well for undisciplined troops as for regular soldiers.

I must here enlarge a little upon the several points of the foregoing argument, more especially for the purpose of making it evident that the range of the infantry musket is the guiding element of all projects of fortification, and so explain the possibility of so great an improvement, in the construction of lines, being consequent upon the invention of Captain Minié.

The lines that have been actually constructed may be divided into three varieties, which correspond with the three cases mentioned above; being respectively adapted to the fulfilment of either of the two essential conditions of defence, independently of the other, and to the combination of the two in the same project.

The first variety includes all lines which consist of uninterrupted entrenchments, which present no gaps except where roads lead through them. The second comprises those composed of redoubts, or detached independent works of any kind, which are expected to prohibit the enemy's crossing the position they occupy, by their musketry and artillery fire; and, finally, there are lines which combine the two sorts of entrenchments just mentioned.

Continuous lines are weakest, from the fact that, if the enemy succeeds in forcing his way through them at any point, even should no more than a single battalion effect an entrance at first, a way is cleared for the main columns. The entire system of entrenchments is taken in the rear, and the defenders find themselves in one of the most perilous situations that can occur, namely, with their line of battle pierced, and either of the two parts of the army, or both, liable to an irresistible flank attack.

It is noticeable that the very pains which may be taken to guard against minor attacks or false attacks, by garrisoning equally every point of the line, render this catastrophe more imminent; for the evil is thereby incurred, of presenting everywhere only a feeble rank of troops to meet the attack of the overwhelming columns of a concentrated attack; so that an army posted behind such entrenchments, even though superior in numbers to its assailants, would probably be disastrously beaten if the latter should attack in heavy masses at different points at once; preventing the defenders from concentrating on these points by false attacks, as well as by such celerity of action as should leave them no time to effect the requisite manœuvres. A striking exemplification of this remark is to be found in the forcing of the French lines at Turin in 1706, where Marshals Feuillade and Marsin awaited the attack of the Austrians under Prince Eugene and the Duke of Savoy, who, although with an inferior army, carried the entrenchments and totally defeated the former; the immediate fruit of

which victory was the capture of the French artillery and baggage, and the raising of the siege. In the attack Eugene divided his army into eight columns, and directed them against the weakest part of the French lines.

The second variety comprises all arrangements of detached works, whether enclosed or open at the gorge, and in a single line or in quincunx order, which aim at preventing the passage of the enemy by their fire alone, or by the additional resistance of troops in the field.

Detached works are better adapted than continuous entrenchments to the strengthening of a tolerably extensive position, particularly if regular troops are to be had for its defence; for in this case the works may be regarded merely as auxiliaries, and as sheltering, to a certain extent, manœuvres effected in their rear; or they may defend particular important points, and so advantageously take the place of large bodies of troops which might be better employed elsewhere.

I can think of no example better calculated to illustrate my remarks on this head than is afforded by the battle of Pultawa, where Peter the Great gained his first but inestimable victory over the Swedes; a victory which resulted in a considerable degree from his judicious location of detached redoubts, and from his exact appreciation of their intrinsic merits, and of their precise sphere of usefulness in a defensive battle.

The Czar not only originated on this occasion this modification of defensive works, but brought to perfection the theory and practice of them, as combined with field operations.

He established his cavalry on the right of his line, placing it in the intervals between seven redoubts, which were well supplied with artillery. His infantry were behind slighter entrenchments of, I believe, the continuous order.

Charles XII had decided on attacking the Russian right with his cavalry, (and had, to favor this manœuvre, despatched General Creutz, with 5,000 cavalry, the night before, with orders to make a detour and fall upon the flank of the same wing simultaneously with the general advance; this body had, however, lost its way, and failed to co-operate.) The assault of the Swedish horsemen was completely successful, and the Russians were driven from their redoubts in confusion. However, the latter now opened their fire of artillery, and from this cause (and the non-appearance of Creutz' s division) Charles' troops were checked, and the Czar found means to rally his cavalry, which, charging in turn, forced their former assailants to retreat, after experiencing great losses.

This seems to have been the decisive action of the day. The Russian infantry immediately issued from their lines and attacked the Swedes, while their cavalry, dashing to the rear, cut off their communication with Pultawa, and cut to pieces the reserve of 3,000 men.

This may be called the first period of the battle, the result of which is well known. Charles' irremediable defeat was owing in part to the enemy's superiority in numbers and artillery, for he had but 21,000 troops in the field and 4 guns, against the 70,000 men and 72 pieces of the Russians; and the failure of Creutz was also against him. But the serious check which his cavalry received, and which spoiled the plan of attack, and gave the Czar an opportunity for his subsequent

brilliant manœuvres, was independent of the disparity of numbers, and was due altogether to the redoubts on the right flank.

It must here be recollected that the redoubts in question were in the first place strictly *auxiliaries*, and that Peter's disciplined troops gained the victory by a counter attack, and also that the position defended was of *small extent*.

It is a different affair when a position of many miles in extent depends principally upon lines of works for its strength, and especially in case the defenders are other than veteran troops.

The battle of Fontenoy (1745) furnishes another instance in point. On this occasion the French line was strengthened on the right by the village of Antoin, next by that of Fontenoy, and on the left by the wood of Barri, which had been fortified, in order to render it equally defensible with the villages, by *three redoubts*.

The Duke of Cumberland, after the Hanoverians had been twice repulsed before Antoin, and the English three times before Fontenoy, decided to attack the left wing, and ordered General Ingoldsby to carry the redoubt which lay nearest to Fontenoy.

The general, however, on approaching it, declined to assault it before he should receive a battery of cannon; and as much time was thus lost, the duke ordered the advance to be made in column between the redoubt and the village, and under the fire of both.

The indomitable bravery of the British enabled them thus to penetrate the French lines, but it was with immense losses, which, though insufficient to stop the advance, still must have had a great effect on the troops, and prepared their commander for giving the order to retreat, which followed the counter attack executed by the "Maison-du-Roi," or household troops of France.

That Marshal Saxe himself attributed a considerable share of his glory to the redoubts mentioned, appears from his speech to the king after the victory. He said: "Sire, I have to reproach myself with not having placed another redoubt between the wood and Fontenoy; but I did not believe any general would risk passing through the interval."

I adduce the above example merely to give force to my remarks concerning the proper sphere and adaptation of detached works.

In discussing the merits of *lines composed of these latter*, as they have been employed, or could have been employed, previous to the introduction of the long-range infantry rifle, the following considerations occur:

To impede sufficiently the advance of the enemy through the gaps between them, the redoubts should not be further apart than double the range of musketry. On this account, and because of the limited distance at which the musket is effective, the number of redoubts must be great to enable them to support a long line properly. The consequence follows that each one must be small, and have a weak garrison, and hence there is little reliance to be placed on the individual resistance of these redoubts, and but a slight effect can be expected from their fire.

The above consideration leads us to an estimate of the minimum number of inclosed works that can form a defensive system, for they must be within 500 or 600 yards of each other, at the furthest, if the

ordinary infantry musket is the arm of the troops; but whenever the fortifications have been regarded as the main reliance of the defence—and this is the case we are investigating—the redoubts, or lunettes, have been placed within 250 or 300 yards of each other, so that the difficulty, thus touched upon, becomes very doubly serious, and has this consequence: that to derive the greatest benefit from inclosed works alone in the defence of extended positions, they must be few in number, and the intention must be abandoned of forcing the enemy to pass under their fire, and experience great loss, in order to cross the lines.

As there is no material obstacle between the works to retard the columns of attack, this conclusion amounts to placing the aid derived from the fortifications, when they are of this sort, in a subordinate estimation, compared to the active defence which is expected from the troops in the field.

It is plain, therefore, that the system of defence for *long lines*, which involves the use of *detached works only* (unless, indeed, the country is of a very rugged and mountainous or otherwise broken and inaccessible nature,) is worse fitted than continuous systems for a defence by *irregular* troops.

Here the reader will please to recollect the abstract of the argument in hand, and note that the above reflections, which are suggested by, and refer to, only those lines that have been constructed (in actual warfare) before the eastern war, do not apply in such a degree to similar works that may hereafter be thrown up, because of the improvements which have within a few years been made in the habitual fire-arm of the infantry soldier, an element in warfare which forms the very foundation of all plans of fortification, whether temporary or permanent.

The smooth-bore musket, (which had not indeed received much improvement, in regard to range, since Peter the Great and Turenne defended with it the entrenchments of Pultawa and Dunkirk,) was considered by military writers of the date of Wellington, and up to the time when the Minié rifle was invented, to be *effective*—that is, be tolerably accurate of aim, and to cause mortal wounds, at ranges inside of two hundred yards; and three hundred yards was the furthest limit at which deadly effects were expected from it.

It is by a comparative estimate that the prodigious effects of the Minié rifle may be judged of by those who have not had the advantage of witnessing its performances; and such of my readers may, by referring to the tables in my first "Memoir on Fortification," assure themselves of the correctness of the following statement: that the Minié rifle, or the new United States regulation rifle musket, is four times as accurate at six hundred yards, as the musket (smooth-bore) is at three hundred yards. As to the force of the elongated projectile of the new piece, it is sufficient to say, that at one thousand yards it will pierce through and through a pine plank of three inches thick.

At Bomarsund a French battery was "exceedingly annoyed" (in the language of the official account) by the fire of some Finnish riflemen, who were stationed in high points of the Keep, although the range was 900 yards. During the siege of Sevastopol the allied batteries were repeatedly silenced by the Russian riflemen in the "rifle

pits," which were between six hundred and seven hundred yards distant; and the effects of this fire were so severe that the pits were ordered to be taken at any hazard; the great losses sustained in the execution of this order is a proof that the necessity for it must have been great.

It may, therefore, be considered perfectly demonstrated by experimental practice, and by actual warfare, that the detached works, which may be thought necessary to strengthen future defensive positions, may be placed more than twice as far apart as in former times, and still fulfil the desirable condition of perfectly sweeping by their fire all the ground over which they are distributed. It follows from this, that to protect a given extent of country and form a defensive system, half as many redoubts as were formerly requisite will now suffice; and hence, the number of troops disposable for their garrison remaining the same, each one may be made larger, more capable of defence individually, and constituting more of an impediment to the enemy; and, in fine, such a system may be made to combine every desirable requisite as constituting a highly defensive artificial military position, with the sole exception of not presenting a continuous material obstacle to the enemy.

If, therefore, we combine a continuous line with a system of large detached works at 1,200 or 1,400 yards intervals, we shall have as perfect a system of fortification as is possible or can be desired.

The preceding discussion on continuous and on detached lines has been longer and more elaborated than I intended; but as it has developed fully all the military elements of the problem of defending with undisciplined troops, or with inferior numbers, an extensive position, we can, in considering the third class of lines, spare ourselves the pains of theoretical analysis, and form a correct judgment upon the lines which I propose for the protection of Brooklyn and New York, by simply submitting the scheme to the test of the general principles already elucidated, having the data of a knowledge of the topography and extent of the position, and a description of the system of fortification which is to be adopted.

But, though a theoretical consideration of the third class of lines is here superfluous, an example will be of use as serving to fix definitely the notions which the preceding reflections give rise to; and I will, therefore, briefly refer to the wonderful lines by which Todleben enabled the garrison of Sevastopol to resist so long the most tremendous maritime expedition that the world ever saw.

These works, which are described by many authors, should be studied by every officer who professes to reflect upon the principles of his art. Nothing can surpass them in boldness of design; and never will there be seen a more masterly adaptation of detached works, and continuous entrenchments, to the topography of a position. In this instance it was the location of the works alone which gave the line any strength; for the different fragments of it were, from the short time allowed for their construction, of no more than a minimum strength, and formed, intrinsically, insignificant obstacles. Nothing, also, can more prominently display the military genius and originality of the modern Vauban, than his having seized the opportunity offered by the arming

of the Russian infantry by the Liege rifle, to expand the scale of fortification at once to four times the dimensions which it had been restricted to by the contracted range of the smooth-bore infantry musket.

[The report of Capt. G. B. McClellan, accompanied by a map, gives the best description of the lines in question that I have seen ; and I am indebted to it for the following abridged special account :]

I will refer my readers to this, for definite information relating to the topography of the ground occupied by the lines ; for my present purpose it is sufficient to state that they formed a semi-circle resting on the harbor at both extremities, and having an extent of over four miles ; their site is varied by hills and valleys, running on the west side parallel, and on the east, perpendicular to, the general direction of the works.

The line fortified may be divided into seven fronts—that is, units—each one being composed of a continuous entrenchment, resting at each end on strong detached works ; the first is from the left of the line to the Little Redan, its length being nine hundred yards ; the second from the latter point to the Malakhoff, seven hundred yards ; the third lies between the Malakhoff and Great Redan, and is one thousand one hundred and sixty yards long ; the fourth reaches from the Great Redan to the Flag-staff bastion, and is one thousand six hundred and seventy yards long, or almost a mile; the fifth is from the latter point to the Central bastion, five hundred and fifty yards ; the sixth extends to the Quarantine bastion, one thousand four hundred yards ; the last front is one thousand yards long.

The familiar names of the Malakhoff, Redan, &c., refer to the works which were first constructed by Todleben when he undertook to fortify Sevastopol, on the land side, in the shortest possible time.

He commenced by occupying the IMPORTANT POINTS BY DETACHED WORKS GENERALLY CLOSED AT THE GORGE. The first efforts of the garrison were directed toward giving these sufficient strength to resist assault; afterwards, they were CONNECTED BY RE-ENTERING LINES of a weaker profile, which served to enfilade the ravines and flank the main works. These lines were generally, though not always, CONTINUOUS.

As to the theory of the defence, the Russian engineers appear to have relied upon the *collateral* works for flanking defences, and arranged so as to obtain a sweeping fire from these over the ground lying in front of either of the independent detached works, preferring to take their chance of stopping the enemy, by heavy losses, before he arrived at the ditches, rather than devote their means to the immediate flanking, at short range, of these ditches.*

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* The most interesting details connected with these lines are, the rifle-pits and the bomb-proofs.

The latter were ample in number. They were sometimes under the rampart, sometimes under the second line of defence, often under special traverses, and occasionally entirely under ground, and even hollowed in the solid rock. The underground ones are considered by Captain McClellan the best, as in that position they would afford no cover or other advantages to an assailant who might gain a temporary footing in the salient of the work.

The rifle-pits consisted sometimes of a little pile of stones, or baskets of earth, enough to shelter one man ; while the largest were semi-circular excavations that would hold forty men. These were arranged, in front of the Volhynian redoubt, in two lines, forming a salient angle 250 yards in advance of the work.

CHAPTER IV.

SYNOPTICAL ACCOUNT OF SOME CELEBRATED LINES.

It is unnecessary to go very far back into history to get enough examples of extensive lines to serve to deduce general principles from. It is, however, certain that the most celebrated generals of all ages have relied upon them to extricate themselves from positions of great danger.

It was by means of strong lines that *Cæsar* resisted a much superior army of Gauls at Alexia. *Turenne* made use of double lines at the siege of Dunkirk. *Prince Eugene* covered his army, while besieging Lille in 1704, from the attacks of the Duke of Burgundy by lines. The French lines at Turin, in 1706, have an unfortunate celebrity, from the facility with which they were stormed by Prince Eugene; the ill arrangement of the works, and their weakness, combined with the bad generalship exhibited by Marshal Feuillade in attempting to defend entrenchments that were intended, like most lines of circumvallation, only to resist surprises by small parties, to cause the defeat of the French and the raising of the siege.

In 1709 the French lines at Malplaquet were forced by the allies under Marlborough and Eugene; but so terrible were the losses of the latter, that they experienced all of a defeat but the name.

As it was, the lines were incomplete, and the position itself was objectionable on account of its separating the French army into portions which must each depend on its own resources, as it could not be succored if driven back.

There were some hollow ways, also, by which the position could be approached, and certain passes through the forest in front which had not been well defended. In addition, the French had not outposts in this woods beyond the abattis, so that their general was ignorant of the movements of the enemy till the latter had approached near the position.

With regard to the nature of the entrenchments themselves, much fault is to be found with them for being open in the rear, and also presenting intervals by which the enemy could penetrate; this weak disposition was not strengthened, as it should have been, to make it consistent with the intention of a "line with intervals," by strong enclosed works; on the contrary, none of the latter were used.

Above all the position was susceptible of being turned, and in the battle (which was conducted by Eugene with great skill) it was turned; this circumstance alone would have decided the French to retreat, but they did not do so till after night, and the allies were not aware of their having left the field till next morning.

The latter were, however, too much weakened and disordered by their losses to pursue.

In 1710, the French armies having been reduced to a strictly defen-

sive policy, Marshal Villars fortified and occupied, as a frontier defence, the line extending from the sea, at the mouth of the Canche river, to the Meuse; first following the Canche, then across a divide to a river flowing into the Scarpe, at Arras, and down the Scarpe to the Scheldt, at Valenciennes; from this across a divide to the Sambre, and down this to the Meuse, at Namur.

The enemy was in advance of the left of the centre, besieging the fortified town of Betteune.

The object of the greater portion of the line was to prevent marauding expeditions of the enemy, and for this purpose the rivers, where they existed, formed a sufficient obstacle, if defended simply by patrols; and between Valenciennes and Landrecy a continuous line of field works served equally well; the patrols, or "flying camps," were furnished and supported by the fortified towns along the line.

The portion extending from the Canche river to Arras was unprotected by any natural obstacle, and was directed in front of the enemy; it was here the French army encamped, and the line was of, say, sixteen or twenty miles in length, formed by a series of redans, located with regard to the configuration of the ground, and strengthened by redoubts and by marshes formed by backing up the streams.

This part of the line was chiefly intended to protect the French army in its manœuvres to the right or left, for the purpose of opposing the allies in their attempts upon either of the fortified places of the frontier. * * * * * * *

The "lines of the Queich" were first fortified in 1743, when they consisted of detached works, in the location of which but little attention was paid to reciprocal support.

During the seven years war, in 1760, the line was re-established, and the general arrangement and ensemble of the works were very much improved.

During the war of the French revolution, in 1797, the line was again put in a defensive state, but on a plan not exactly the same as in 1760.

The following is a description of the lines as they existed in 1760:

To comprehend their object, it is necessary to state that they were situated so as to close the passage into France which lies between the Vosges mountains and the Rhine; being thus a complete barrier to an invading army coming from Mayence, or the Palatinate, above that city.

The extent of the line was about fifteen miles; its left was the town of Anweiler, which was surrounded by a loopholed wall, and which closed the débouché through the mountains, by which, otherwise, the line might be turned on this flank.

The right rested on the Rhine, was protected in front by a large marsh, and was strengthened by a village, which was fortified with care. The centre was protected by the fortified city of Landau.

From Anweiler through the mountain valley of the Queich were fortified posts, strengthened by inundations effected by dams thrown across the small tributaries of the river.

At the point where the mountains subside into the plain was a village, which was fortified and surrounded by seven redoubts; between

this and Landau the line was protected by the Queich, which could be raised by mill-dams so as to inundate its banks, and received additional support from a canal in rear of the latter; hence no entrenchments were thought necessary on this portion, especially as they were, for some distance, under the fire of the artillery of Landau.

Below, or to the right of Landau, the first mile and a half was formed of a continuous redan line, which was so disposed as to retain the waters of the river and create a wide marsh in front; a lunette and a redoubt were stationed in advance, and a mill and an entrenched village strengthened the position.

For a third of the distance from this to the Rhine, the line was formed of slight entrenchments preceded by small inundations, on the farther side of which two entrenched villages and two enclosed works were situated.

From the last point indicated, to the right, the position was protected by field works of the nature of a cremaillére line, adapted carefully to the ground, and laid out with great skill, so as to supply the want of a natural strength equal to that of the other positions; the continuous line was strengthened by advanced detached works. The extreme right was upon high ground, with a steep ravine in front, which was occupied by redoubts and strengthened by abattis. The marsh in front has already been mentioned.

There was every facility throughout the line for communication from one end to the other, by good roads running the whole length of it, in its rear; and on the left half of it there were several parallel roads, so that communications would not be interrupted by the enemy even if he should gain a footing inside of the line.

This line is a highly instructive instance of a frontier barrier, adapted not only to resist the invasion of a large army, but also calculated to secure the country in the rear from marauding parties, which might otherwise enter for purposes of plunder.

The *continuous nature of the line* was intended to effect the latter object, and it was expected that the *fortified villages and redoubts*, and especially the Place of Landau, would (like the inclosed works I recommend in my project for the fortification of Brooklyn) enable an army of defence, by occupying them strongly, and calculating on meeting the enemy, at any point of the line that might be forced by him, with a reserve, to repel a much superior army. * * *

In 1761, Frederick the Great found himself reduced to the greatest extremities; he was hard pushed by the Austrian and Russian armies; the great disparity of forces forbade his receiving battle, and to retreat would be to lose Schweidnitz, and otherwise greatly imperil the campaign, which was a critical one for Prussia.

From this danger, the greatest he had ever encountered, Frederick saved himself by a stroke as daring as it was well combined. He occupied and entrenched the position of Buntzelwitz, near Schweidnitz, where his army could receive an attack with every chance of success; at the same time he prevented the investment and siege of Schweidnitz, covered Breslau, and kept within reach of his magazines.

These famous lines formed a sort of oblong, with six salient angles; these last were located on projecting and commanding hills or spurs;

he whole position was formed by a chain of hills of different declivities, varying from steep to gentle, and separated from each other by several brooks; the two principal of these covered the front. The perimeter of the camp measured from twelve to seventeen miles, according to an estimation, around the most salient and detached works, or round the more continuous line in the rear. The ground inclosed was a fine plain, adapted to manœuvres, and a wood, which stood in front, had the effect of hiding the latter in a great degree from the enemy's view. All the hills were strongly entrenched by works which held a numerous artillery, and slighter lines connected these points. The whole perimeter of the position was also surrounded by abattis, trous-de-loup, and fougasses; and though put in a respectable attitude of defence by ten days and nights' incessant labor, directed and supervised by the King himself, the Prussians did not cease to improve their lines during the whole time they were menaced by the enemy.

On arriving in front of these lines, the Austrian general, Laudon, was for attacking them, but would not do so without the co-operation of the Russian army. Failing to persuade the commander of the latter to approve his plan, both armies decamped after spending twenty days before the lines, which had by that time attained an almost impregnable strength. * * * * * *

The Spanish lines of Boulou, in April, 1794, are an instance of a strong and extensive position, strongly entrenched, but which fell easily, in consequence of an oversight or blunder on the part of the designer of the works. These lines were occupied by a Spanish army, to prevent the French revolutionary army of 35,000 men from entering Spain by way of Bellegarde. The camp was traversed by the Tech, and separated from the plain of Vallespir by a chain of hills, and was fortified with exceeding care. The line was in the form of a right angle, the point of which was towards the front and right. The right side commenced at a hill, strongly entrenched, on the far side of the river, and, crossing the narrow valley, ran up the mountain on the hither side, resting finally on the castle of Montesquiou, near the summit, and around which it was not supposed the enemy could pass. The left half of the angle, or the front of the position, ran on the far side of the river, and finally, turning short, crossed it, resting on the height of La Guardia, which commanded the bridge of Ceret. The arc thus fortified had an extent of 11 or 12 miles. The weak point of this position was the extreme right, which could be turned, owing to the omission to fortify the highest peak of the mountain which lay to the right, and in rear of, the castle of Montesquiou. The French general accordingly attacked the camp by sending 10,000 infantry and 800 cavalry to seize the height in question, which they did without opposition, while the main body made demonstrations in front. The result was that the Spaniards considered themselves lucky in being able to retreat by an improvised road over the mountains, (leaving all their guns, 150 in number,) their line of retreat by Bellegarde being overlooked by the same height which enabled the French to gain the rear of their works. * * * *

During 1794 and 1795 the French had been constructing on the left

bank of the Rhine, strong lines, for the purpose of blockading Mayence, which city they expected to besiege. Mayence, being built on both sides of the river, formed a *tête-de-pont* for the Austrians, and the latter unexpectedly issued from it, (Oct. 29, 1795,) broke through the lines, and thus took up an extremely advantageous position between Jourdan's and Pichegru's armies, the latter of which was especially threatened, and might have been disastrously beaten if this successful attack on its left wing had been vigorously followed up. Owing to the attack being unforeseen, the garrison of the lines consisted at the time of but 3,000 men ; and of these a certain proportion had just arrived, having been detached from the army of the Sambre and Meuse, and were not, from their little acquaintance with the localities, or with their duties, much better than spectators of the combat.

The lines were composed altogether of open works, the main defence being a continuous line of curtains, flanked by redans and bastions, and located on the edge of the heights looking towards Mayence. In advance, and in some parts in rear also, were flêches and lunettes, but nowhere redoubts, so that the whole line could be turned by the forcing of any weak point of it. In addition to this defect, the works were nowhere strong enough to resist the attack of large bodies of men, and also presented a weak point at their right extremity ; which, instead of being connected with the river, left a wide meadow, which might be used to turn the flank of the whole position. This oversight was the more fatal as the line of retreat of the centre and left wing would be menaced in case of the successful attack of, or turning of, the right.

The Austrian General Clerfayt, having a perfect acquaintance with the French lines, attacked them in three columns, putting his greatest strength into the attack on the French right. In this he was assisted by a flotilla, which landed two battalions in the rear of this end of the line. The attack on the right and centre being successful, the French left had to retreat, though its defence had been successful, and the whole army retired in disorder on the Pfrim river, in order to get nearer to the main body. In this battle the Austrian soldiers scaled the works, musket in hand. The immediate results were the capture of all the French heavy artillery, and great stores of siege materials and provisions. * * * * * *

Wellington's lines of Torres Vedras (1810) are justly celebrated for their vast extent, their natural strength, and the admirable manner in which every resource of the engineer was called into action in adapting the defence to the site, the means disposable, and the necessities of the case.

Not less wonderful are these lines for the complete manner in which the labor of their construction was repaid by the invaluable results obtained by their means.

No less a stake than the possession of Portugal depended on their strength ; and, indeed, if they had been forced, the consequences might, like those of the capitulation of Baylen, have been propagated in a manner to be felt throughout Europe.

But for these lines there can be little doubt that the victorious Massena, with his 110,000 veteran soldiers, who had pursued the British to this contracted cul-de-sac, would have driven them into the sea, or

at least forced them, like Sir John Moore's army, to end a disastrous retreat by seeking safety in their ships.

This supposition is corroborated by all the circumstances of the campaign, but especially by the excessive solicitude exhibited by Wellington in hastening the construction of the works, and incessantly laboring to augment their strength during the entire year that seemed likely to witness an attack upon them.

The lines were two in number, concentric, and extending from the sea to the Tagus; and, as the British fleet and gunboat flotilla had the entire possession of both these barriers, the position could not be turned.

Thus shutting off Lisbon from the rest of Portugal, they afforded an unequalled position for a defensive battle, with every chance of success; and even if beaten, which must be with great loss to the attacking army, the defenders could still retreat into their fleet; an operation which was assured by the entrenched camp, or tête-de-pont, which, isolating the extremity of the peninsula, would effectually protect an embarkation.

The total force under Wellington's command amounted at the least to 130,000 men, British and Portuguese together; of these 60,000 were detailed for permanent garrisons for the forts and redoubts; the remaining 70,000 were the best troops, and were designed for manœuvres.

The first line was originally intended to serve as a check to an attacking enemy, and the second was to be the main reliance; if this, too, was forced, the army was to take refuge in the entrenched camp, and enter the ships under its shelter.

The first line, however, became so strong, by dint of constant labor upon it, that Wellesley finally made his calculations to take a decisive position behind it.

The first line was 29 miles in extent, and beginning at Alhandra, upon the Tagus, crossed the peninsula, following, on its western slope, the Zizandre, and finally terminating where that river empties into the ocean. Beginning on the right, (at Alhandra,) the first five miles of works were upon a ridge which had naturally been steep, but was now scarped for a height of 15 or 20 feet, so as to be almost inaccessible. The next five miles were laid out upon two mountains which were defended by redoubts. The centre of the line was occupied by field works, (strengthened by an immense redoubt mounting 25 guns,) all seated upon the lofty Mount Agraça, which, besides the strength afforded by its height, presented a view of the whole line of works on either hand, and of the approaches to them.

Of the 10 or 12 miles on the left, the first seven were lines well seated behind obstructed ground, and with the river Zizandre flowing in front of them; the remainder of the line was protected by inundations, and the field works were strengthened by many redoubts and forts, one of which was of enormous size and mounted 40 cannon. A paved road ran behind this part of the ground, and contributed to strengthen it by facilitating manœuvres from one wing to the other.

A feature of the ground, that was very advantageous to the British, was this: that in front of the line, opposite Mount Agraça, rose the

towering Monte Junta, which could only be crossed at some miles distant from the front, and which, therefore, would prevent the French from attacking both wings of the British line at once; also, the former must be very cautious in attacking the left, even singly, as the latter might sally from their lines, during the passage of the mountain, and attack the front or rear of the column en route, thus taking it at a great disadvantage.

The second line was laid out at from 6 to 10 miles behind the first, and extended from Quintella to St. Lorenzo, a distance of 24 miles—without giving a description of it, let it suffice that it was stronger than the first, and that in it, still more than in the other, redoubts, forts, water-cuts, scarps, abattis, and entrenchments of all sorts, were constructed without regard to labor or expense.

To give a proper idea of the pains bestowed on the works of Torres Vedras, the following description of the defences of the outpost line of Arunda is given:

Across the ravine on the left of Arunda, a wall of dry stone was built, 30 feet high and 16 feet thick; across the valley of Arunda an abattis was constructed of full grown oaks and chestnuts, which had to be dragged several hundred yards, and were so reset and crossed as to be perfectly impenetrable, while a breast-work, in the rear, afforded cover for troops. Along the ridges for three miles ran a stone wall six feet high and fourteen feet thick; altogether it was considered that the single division that guarded this post could defend it against 20,000 men.

The entrenched camp or tête-de-pont had an extent of 3,000 yards and was seated near by the permanent fort of St. Julians, at a distance from the second line varying from 24 miles to two days' march in its rear.

Before Massena arrived in front of the lines he was altogether ignorant of their strength; a reconnaissance of them induced him to change his first intention of storming them immediately, and, upon a closer examination, he despaired of doing so until he should receive reinforcements. It then became a question of time, whether he could remain long enough to give the latter time to join him; for the country in his rear was not fruitful enough to afford subsistence for a great length of time to his numerous army. On the other hand the anglo-Portuguese forces, and the inhabitants of the inclosed district, were in equal straits for food; the latter much the most, for in the struggle of endurance which ensued, and which lasted through the winter, 40,000 persons died of want within the lines.

During the blockade, however, the lines continued to increase in strength; and the storming of them, which had appeared hazardous at first, became at last an impossibility; the reinforcements did not arrive, and the French had exhausted the country of every sort of subsistence that would support life.

Finally, after displaying in the highest degree the obstinacy which characterized him, Massena was obliged to retreat, baffled, not by the army, but the *lines* of Wellington. * * * *

Soult's lines on the Nivelle form an instance of a strong position of great extent, but badly fortified and ill-defended.

In the latter part of 1813 Soult found himself stationed on the Spanish frontier of France, with about 66,000 soldiers; his task was to prohibit the passage of the combined army of 90,000 men under Wellington. He decided to take his stand in the triangular district which is bounded by the sea, by the Nivelle river, and the mountains on its left bank, and by the Nive, from its source to the Mondarin mountain, which last commanded the bridge over it, and which could not be turned.

Both flanks were thus secure, and the front was strongly seated on mountains and strengthened by a river; in its centre, and on a commanding height, was a large redoubt, called the signal redoubt; in front of it, on the slopes, were numerous field works, and in advance of these, trenches and abattis. Three large redoubts lay towards the left, and on the extreme right inundations had been effected, which formed a great obstacle to an approach on that side.

The whole extent of front to be defended was 16 miles. Soult spent three months in entrenching this position, but the works were ill-planned, being mostly open works, and easily turned by the gorge. Many of the redoubts that were commenced were incomplete when attacked, and some were so placed that the garrisons could not depress their pieces enough to bear upon the attacking columns. Their revetments, of dry stone, were readily climbed by the British, but most of the works taken were entered by the gorge. The troops were deprived, by the broken nature of the ground, and the want of roads in rear of the works, of the power of mutual support; so that however strong an attack might be experienced by either wing, it could not be reinforced from the centre.

In the attack of these lines, which took place in November, Wellington profited by all the defects of his opponent's arrangements.

His main attack was against the left of the centre, the key of the position, and he threw 44,000 men upon the 15,000 French who guarded the works near this point, holding in check a division of 12,000 men in another quarter by 6,000 British. The works were not found a serious impediment by the attacking columns owing to the defects above mentioned; one fort especially was so ill situated that the defenders were driven out of it by a battery of horse artillery which galloped up an unfortified hill in its rear and opened a plunging fire into it.

With all the disadvantages of bad communication it seems probable that the defeat of the French, and their retreat from the position, would have been obviated by the use of redoubts instead of open works; by giving them a strong profile, and by a judicious location of them among the hills and between the lines of field works.

This view is borne out by the stubborn resistance which the signal redoubt offered; it held out after the whole line had retreated, and withstood three attacks with a loss of but one man killed, while the British lost 200 in killed and wounded; the redoubt finally capitulated, as further resistance could be of no service to the defence of the position. * * * * * * *

As the two remaining examples of lines that I have examined have

not had the merit of being tested by actual attacks, I will dispose of them briefly:

The first is the entrenched camp (as it was called) of Drissa, constructed by the Russians in 1812, on the occasion of the grand invasion of their country by Napoleon. Without going into detail, it is worth mentioning that the works were laid out on an arc of five miles, which corresponded to a chord of $3\frac{1}{4}$ miles.

On the front, and distributed over an extent of 7,000 yards, were ten redoubts; at the two extremities this line rested upon the river. Between the redoubts open batteries of artillery were established. Each redoubt was covered in front by low field works, of 220 yards development, and laid out at 130 yards in advance.

Before the left of the line there was a wooded marsh; and to prevent the enemy from profiting by this, some of the trees were cut down, and used in forming an abattis, which was of about 2,000 yards extent, and over 420 yards in advance of the line of redoubts.

Between the seventh and eighth redoubts there was built a large bastion-shaped work, with a gorge of about 320 yards, which communicated with the redoubts by a sort of curtain of 140 yards in length. Behind the centre of this bastion, and about 200 yards in rear of it, was located another redoubt.

A second line of works lay at a distance of 360 yards behind the front of the first—it was composed of five redoubts; and finally, at 900 yards in rear of the centre of this second line was another redoubt, making seventeen in all.

The bastion and nearly all the redoubts had their ditches palisaded, and were surrounded by a triple row of trous-de-loup.

This defensive camp, or lines rather, is worthy of much study, and I shall offer it as a strong support to my argument. At present it is only necessary to remark, that the general disposition, in this case, is evidently formed on a wish to have the defence accumulated in a few inclosed works of great strength, which, being situated at an average of 750 yards apart, from centre to centre, will each have a flanking fire over the nearer half of the intermediate entrenchments.

It is also probable that the latter were arranged to facilitate counter attacks by the garrison, in case the enemy should be repulsed. * *

The lines of circumvallation of the allies at Sevastopol were constructed with the single view of shielding the army from a Russian attack. The usual object of lines of circumvallation is *chiefly* to prohibit the entrance into the besieged place of reinforcements of troops, ammunition, or provisions, which might otherwise elude or break through the investing force, and make a dash for the gates of the place. But here the investment was only half complete, which is the same thing as entirely neglected.

The Russians could enter the fortifications on the south side in any force, large or small, by crossing the bay, or by marching along the shore. Consequently the lines from Inkerman to Balaklava were purely defensive. It is to be remarked, also, that these extensive works were not judged necessary at first, but that the allies were induced to adopt them, and afterwards to continually strengthen them

by receiving severe admonitions and demonstrations of their value, especially in the battles of Balaklava, Inkerman, and the Tchernaya.

The lines were double; the first one extended from Inkerman to Balaklava, along the northern and eastern boundaries of the plateau of Chersonese, and along the Tchernaya, and behind the canal, (which forms a second obstacle to an attacking army,) and so along to the hilly ground of Balaklava. The total extent of this first line was over six miles. Its object, as stated before, was to protect the right of the besieging army and its depots at Balaklava, and its line of communication with the latter point.

That the advanced line fully effected this purpose is proved by the resistance which it enabled the French and Sardinian troops, who defended the position attacked, to offer to the Russian attempt of August 16, 1855.

On this occasion the enemy's forces, consisting of 6 divisions of infantry, 3 of cavalry, and 150 guns, and estimated in all at from 40,000 to 50,000 men, made an obstinate attack on that part of the lines which lay in the vicinity of the Traktir bridge over the Tchernaya.

They were repulsed with the loss of 3,329 killed alone. The number of wounded is not stated, but the French took care of 1,600 of them, besides those who were carried off by their comrades.

This signal repulse was effected by 12,000 French and 10,000 Sardinian troops; and the result is to be explained only by admitting the great defensive value of the lines as an adjunct to the naturally strong position.

This conclusion is made positive by the fact that, after the battle of the Tchernaya, the French took greater pains than ever to add to their works, which they rendered almost superfluously strong.

The *second line* ran across the peninsula, from Streletzka bay to the sea, in a southerly direction, following the elevated ground; the extent of it was about 8,000 yards, the works were continuous, and strengthened at various intervals by eight redoubts, in the shape of bastions closed at the gorge. These bastions were of great size, and probably quite strong.

The object of this line was, like the third line of Torres Vedras, to provide against a ruinous defeat of the allied armies, which should necessitate a retreat into some secure position, where they could await reinforcements, or from which they could, if fortune should continue against them, re-embark into their fleets and leave the Crimea entirely.

The second line was therefore laid out so as to be defensible by a small part of the army, while the main body might be transferred to the ships.

In my propositions for the defence of New York I shall have occasion to refer to this last line, which is, in several points, analogous to the one I suggest. The chief features of resemblance are, its extent, the closing of the gorges of the bastions, the connecting them by continuous lines, and the variable distances at which they are placed, together with the great average distance which is flanked by each.

CHAPTER V.

PRINCIPLES RELATING TO LINES DISCUSSED AND APPLIED TO THE PARTICULAR CASE IN POINT.

First. Each extremity of a fortified line should rest upon an obstacle which may be considered impassable by an enemy, and which the latter should be unable to outflank or march around. Large rivers, the sea, rugged mountain ranges, such are the indispensable supports to the flanks of an extensive entrenched position.

Thus the lines of the Queich rested upon the Rhine and the Vosges; the French lines of the Nivelle upon the sea and upon the inaccessible Mondarin mountain, upon which were works that commanded the bridge over the Nive river, passable only at that point for the enemy.

The lines of Torres Vedras extended from the Tagus to the sea.

The French lines of circumvallation at Sevastopol rested at each flank on the sea, and the English, or advanced ones, upon the sea and on the strong position of Inkerman.

The lines at Mayence might have been made to rest at both ends on the Rhine, but the right flank was not joined to the river, and the neglect of this precaution was the cause of the Austrians forcing the position.

At the lines of Boulou a similar neglect, in not securing the mountain summit, which formed the extreme right of the position, caused the loss of it to the Spanish. * * * * *

Second. The lines should present a continuous uninterrupted barrier of a profile not easily to be clambered over. Gaps in the line are as good for the enemy as breaches ready made by his artillery or sappers, because the moment the artillery of the defences is silenced, and the troops are driven temporarily from the parapets of the flanks, the assaulting column can enter at a run, without any impediment to give the defenders time to resume their fire.

It must here be understood that, though uninterrupted, the entrenchments should not be simply of the kinds commonly called continuous; that is, of a series of curtains, flanked by any or all of the elementary field works which are open at the gorge. It was such a line as this which caused the defeat of the French at Turin, and such will always involve the ruin of their defenders, owing to the following reasons:

The army which guards an extensive, continuous line, must find its safety in completely prohibiting the enemy from crossing it at any point; should they succeed in passing the line at the centre for example, they could concentrate their forces, and, marching to the right or left, attack in flank the defenders, who must receive their reinforcements from the wings by piecemeal; and, as is always the case when the flank is surprised, the latter arrive too late to be of service, and in time only to be beaten in detail.

But if, to guard against the lines being forced at every point, the general posts his troops so as to render the entire length of the works equally strong throughout, he renders his defeat a matter almost of certainty; for the dissemination of his forces, which is thus produced, renders it impossible, with the largest army, to have enough troops everywhere to resist the onset of a column which perhaps is made up of the main body of the enemy.

Manœuvres of the troops for the purpose of accumulating them at the point attacked are not practicable, for the forcing of a fieldwork insufficiently garrisoned is the affair of a few minutes; and, besides, the attention of the defenders will be distracted, by several false attacks, from the decisive one. * * * *

Third For these reasons the [technically called] continuous lines have seldom been resorted to without being strengthened by strong redoubts, or star forts, situated at intervals either in front or in rear of, or forming a portion of the line.

At the same time it is apparent that the same reasoning that has just been given will apply in a certain degree even when the lines are supported by redoubts; I should say that it has been susceptible of application until the recent improvements in the soldier's musket, which, by vastly increasing its range and accuracy, afford an opportunity for reconciling those clashing conditions which as I have just shown are not to be harmonized at all in continuous lines, and which it hitherto required great skill to reconcile, even with the assistance of inclosed works. To make clear the point in question, it must be stated that writers on the subject of field fortification generally fix the limit of effective range of the musket, in actions of this nature, at less than 200 yards—it will carry further, but with no exactness—and at 300 yards the force of the ball is spent. The exceptions to this rule are few: the greatest variation is found in the practice of Vauban, who calculated the lines of defence of his field-works (in which he exhibited as much genius as in his permanent fortresses) so as to count upon the extreme range of the musket; that is, he fixes the distance from the flanking parts to the salients at 300 yards; but (as St. Paul justly observes) the musket ball cannot be relied on at this distance, either for penetrating power or accuracy; and in addition, the fire of the flanks ought to reach to some distance in front of, and beyond the salient defended by them, so as to give a cross fire on the enemy before he arrives at the ditch. This basis fixes the length of the single front of continuous lines of different kinds, as follows:

Redan lines, at the maximum	240 yards.
Tenaille lines, with large salients	320 "
Tenaille lines, with small salients	240 "
Bastioned lines, (maximum)	240 "

The disadvantages of the tenaille lines when made of the maximum dimensions, the chief of which is the exposure of the lines to ricochet fire, cause the length of 240 yards to be made the rule.

Now, basing the calculation on the same range of the musket, if the continuous line is to be strengthened by redoubts, either these will not be close enough to support the whole line, or there will be a

great number of them. For example: a line of redoubts, to protect, by their fire, each other and the intermediate spaces, must be double, and arranged in quincunx order. Dr. Sellon estimates the distances in each line at 440 yards from centre to centre, which will amount to one redoubt for each 220 yards.

A line formed of detached lunettes, with a second line of redans in the rear, (all rendered enclosed works by stockades,) has spaces of 250 yards at the farthest. In case, therefore, that the latter alternative is chosen, the redoubts will require for their garrison, a great part of the reserve, which ought to act independently of the works; and also the garrison of each one must be small, and the work itself must be small, and consequently weak; the consequence would be that, so far from improving the defence of the continuous line, they would aggravate the disadvantages of the defenders. For this reason redoubts, supporting lines, have generally been placed at wide intervals, and made of large size, strong, and capable of holding a large number of troops. Frequently star forts have taken the place of redoubts, as being intrinsically stronger. This arrangement has been the best one possible, in consideration of all the circumstances; the deficiencies of it have been inevitable results of the short range of the smooth-bore musket.

These deficiencies, to recapitulate them briefly, have been:

1st. That the inclosed works have not protected by their fire the whole length of the open entrenchments which closed the interval between them, thus leaving weak points in the line.

2d. That for a still stronger reason, they have had no power of mutual support by reciprocal flank fire.

It will be seen that the limited range of the musket has been so great a restriction upon the defensive combinations for the defence of extended positions, that no possible arrangement could be contrived to render lines, even theoretically, strong; fine natural advantages of topography and the genius of a great general have been the main strength of such dispositions.

At the present time, however, this restriction is entirely removed by the invention and introduction into all services, as the habitual arm of the soldier, of the rifle-musket with the Minié (or its equivalent) projectile.

Lines may now be constructed of great extent and defensible by a not extraordinary force, and in localities which it would formerly have been considered impossible to defend.

The demonstration of this assertion, which has not before been made, follows naturally at this point of the argument. It can be shown that lines can now be combined so as to fulfil all the requisites of a continuous line and still permit of the defending force being chiefly concentrated at a few points, leaving, besides, a large enough proportion of troops to form a powerful reserve; in other words, all the advantages of any lines that were ever constructed may be preserved, while the former inherent and inevitable deficiencies are eliminated. * * * * * * *

Fourth. Of the proper location and nature of enclosed works in lines.

The enclosed works of a modern system of lines should be—

1st. Located as far apart as possible, to conform to the other essential conditions; because the fewer they are the more pains can be taken with each one to strengthen it, and also, the more troops can be stationed in each, out of the total number that can be spared for the garrisons.

Hence, each work could be stronger in itself to resist a separate assault, and also would give a more formidable flanking fire upon the approaches to and ditches of the intervening entrenchments.

2d. The works should not, however, be so distant as to prevent their sweeping, by their musketry as well as their artillery fire, all the ground between them, including the immediate vicinity of the curtains which join them, and the enfilading of the ditches of the latter.

As I propose to confide the flanking of the entire system to the inclosed works specified, and as the necessity of a thorough flanking, both of the approaches and ditches, of all entrenchments, is an universally admitted military principle, no more need be said on this point.

It is evident that the basis, according to which must be determined the intervals in question, is the effective range of the regulation musket in the hands of the private soldier; this element for the rifle-musket, with which all the United States infantry is to be armed, is 600 yards.

As the distance specified is not obtained from any published or official authorities it will be as well to state my reasons for adopting it.

In the first place, it will be recollected, as was quoted from St. Paul, that the smooth-bore musket was expected to kill at 300 yards; the Aide Mémoire du Génie says that at 300 yards musket bullets begin to give fatal wounds. The *line of defence* has accordingly been fixed at from 160 to 200 yards, so as to give, upon the approaches to the flanked angles, a cross fire, for, say, a hundred yards in advance. For about this distance the assaulting columns would therefore be under a more or less effective fire, which would continually increase in accuracy as they approached the ditch, and would produce about its maximum destructive effect upon the troops while they should be accumulated in the latter and occupied in climbing the scarp.

Let us therefore find the range at which the Minié ball will produce a mortal wound, and see whether it can be assumed as the correlative of the 300 yards for the smooth-bore.

At 300 yards the musket bullet will penetrate $3\frac{1}{2}$ inches into white pine wood; this is an ample estimate, as it is from the French "Aide Mémoire du Génie," which, if I am not mistaken, refers to heavier bullets and a larger charge than our percussion muskets carried. With regard to the latter, it appears* that at 300 yards none of their shots penetrated into oak, and only $\frac{1}{10}$th part stuck where they hit. Now, the range at which the rifle-musket will give an equal penetration is *at least* 1,000 yards.†

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*Ord. Manual.

†Tables of experiments in "Report on small-arms," or table 12 of my Memoir on Fortification, 1858.

As to accuracy, all the published tables go to prove that the new piece is more exact at 1,000 yards than the musket at 300. For example, one series * of trials has found the mean deviation of round musket balls, at 300 yards, to be 3½ feet vertically by 6 feet horizontally. Of the whole number of balls fired in this trial 12 per cent missed the target, of 5 by 10 yards.

A similar trial † showed that the mean deviation of the elongated projectile, from the rifle-musket, at 900 yards, was 2 feet 10 inches vertically and 1 foot 9 inches horizontally, while only 2 per cent. of the shots failed to hit the target, which was 5 by 6 yards.

It must be considered, however, that for firing at early dawn, or on a dark day, or at a company dressed in grey or blue, there is not as good a chance to aim as is always the case at trials, which are conducted in fine weather, and where the mark is a white, conspicuous object; and these drawbacks would be much more important at 1,000 yards than at 600. It must also be taken into account that the undulations of the ground, in any position likely to be advantageous for entrenchments, would probably prevent an uninterrupted view of 1,000 yards in extent; and, in addition, the flanking work must be of an excessive size to be formidable enough to check, by its fire, the body of men which could advance through the interval of 2,000 yards, which would separate the supporting inclosed works, if each were expected to defend a length of 1,000 yards In order, therefore, to be on the safe side, I have adopted the figure of 600 *yards as the effective range of the new piece*, considered as the arm of the private soldier.

The deadly fire of the Russian rifle pits at Sevastopol, at from 600 to 700 yards distance, and the sharp shooting at 900 yards during the siege of Bomarsund, are confirmations, which I regret not having space to enlarge upon, of the correctness of my conclusion.

The range of grape shot is 600 yards also; a circumstance which had an influence with me in fixing the line of defence at that distance.

The two requisites, with regard to *relative* location of the inclosed works in a line, will then be satisfied by placing them at intervals of 1,200 yards apart, counting between their flanks, or 1,400 yards from centre to centre. Of course, if the nature of the ground should require it, they might be placed closer; the system would thereby gain more rapidly perhaps in strength than would be counterbalanced by the expense, for the redoubts need hardly ever be so close as to incur the defects (of numerous works) mentioned on page 76, which are not important, until they get within 700 yards of each other. * * *

Fifth. To place the inclosed works in conformity with the locality and topography, the following principle should be kept in view.

They should be seated upon commanding spots, which lie also rather in front of the line of continuous works; thus situated, they will be difficult of access themselves, and will, moreover, gain a plunging and reverse fire upon the lower ground, in front of the intermediate curtains, and upon the ditches of the latter.

The range of both artillery and musketry will be greater from these high points, and also there will a greater number of shots

* Table 3 of same memoir. † Table 9, idem.

tell in an enemy's column, which must appear larger than if viewed from a level.

The moral effect is, besides, worth noting, as soldiers invariably dislike to pass under the fire of commanding works.

This condition is, after all, one that needed only to be stated; and I have discussed it more for the sake of uniformity than anything else, as it has always been followed in actual lines. * * *

Sixth. The size of the inclosed works

They should be large enough to deliver a very heavy flanking fire on the approaches, &c., of the entrenchments.

This fire should be of both artillery and musketry; in fact all the artillery disposable for the defence of the lines, except the flying batteries, should find room in the redoubts.

In the redoubts, if placed as above recommended, will be the most advantageous position for the action of artillery upon the enemy's columns, and in them, also, the guns will be most secure from capture.

It must be recollected, however, that not only does artillery require much space on the terrepleins, but that it will not do to crowd the latter with pieces to the exclusion of a proper number of troops; for in that case the work would be very liable to be taken by assault; hence, the more pieces the work carries, the greater should be the garrison of it.

Let us suppose that each work carries two six-gun batteries of artillery, one on each flank, the space required for these and three traverses will be 45 yards.

Probably 200 yards of banquette for infantry will suffice, as it is about 80 yards greater than the whole length of a bastion face in the modern system of fortification. This will altogether give the flank a length of 250 yards.

The flanks are the lines which, according to my system, must fix the size of the work, since the latter must positively give a great column of fire in both directions to fulfil the part imposed on it by the theory of the defence.

The flanks being fixed in length and direction, it remains to decide on the manner of joining their ends. The front of the work should give its fire towards the approaches by which an enemy could march to assault it; hence its best disposition will be in two lines or faces, making equal angles with each other and with the flanks.

This arrangement will, in view of the obtuseness of the angles so obtained, permit of all the guns of the two faces, or of a face and flank, being directed along either capital of the work; so that an approach must be under at least the full direct fire of one face.

The lengths of the faces should vary according to the position and importance of the work, say from 60 yards each to 100.

As to the gorge, I propose to construct it in the shape of a bastion front.

The gorge will in most of the redoubts, that is, in all that are laid out on a part of the line which has but little curvature, have a length of about 160 yards; which gives ample room for the tracé proposed.

The object of closing the gorge is purely to make the work equally strong in rear as on the other sides, to resist an escalade. It has no

view of the collateral works, nor of the curtains; and, consequently, we have only to consider how it can be arranged to defend itself in the strongest manner and at the least expense.

That the entrance gate of the work is in the gorge is another reason for desiring to arrange the latter in a manner to make it as defensible as possible.

The bastioned tracé is undoubtedly the one best calculated to answer the single purpose of the gorge, from its strength and simplicity.

The garrison of the redoubts just described should be, on an average, 2,000 men. * * * * * * *

Seventh. In deciding upon the shape and size of the inclosed works of a line, we must, besides the action ofeach *upon the ground around it*, consider the necessity of providing for its separate and independent defence against attempts at escalade, or even a short siege.

It is impossible to separate perfectly these two essential points in *any other sort of work than a redoubt:* but in this the lines of rampart may have precisely the lengths and directions that will enable them fully to sweep the country around, and their approaches, by their fire, and to perfectly enfilade the ditches of the curtains, and flank the ground in front of them; this is possible without the slightest interference with the dispositions for the independent defence of the work, in front or rear; and if this second condition has guided me in planning the gorge of my proposed works, it is because in this quarter the other one goes altogether out of the question.

The second condition, relating to the individual defence of each enclosed work depends upon:

1st. The arrangements for flanking its ditches;

2d. On the profile.

It is because of the peculiar property of a redoubt, of satisfying the above condition separately from the other, that I have chosen it in preference to the star fort, or bastion fort, which have generally been constructed to defend the more important points of lines.

The reason has probably been that there have not been the means of providing for the individual defence of the work, that become necessary for a redoubt; from the same cause, in the field redoubts that have been used in actual warfare, there has generally been a neglect of flanking arrangements.

The latter, when introduced, have consisted of—

1. Galleries of timber, loopholed, along the reverse of the ditches, at the salient angles, so as to enfilade, each, the ditch of one face.

2. Similar galleries running across the ditches at their middle points, for firing both ways each, thus enfilading one ditch.

The timber and plank necessary for these constructions, and the time requisite to build them, have often been wanting, and so have decided engineers not to adopt the redoubt, but to prefer some tracé that would enable the garrison of each work to defend it from the parapets, without any supplementary arrangements. It must be remembered also, that, from the causes I discussed at the outset of this section, depending on the range of the musket, the second condition in question has always been the one most important in an enclosed

work, from the impossibility of satisfying the other more than very imperfectly.

The star fort of 8 points certainly satisfies the second condition as well as a redoubt, arranged with the timber-flanking galleries in question. The former gives a strong fire upon the approaches along either capital, from two lines, which are each, a third of the width of the work in length. There are dead spaces in the inner ends of the ditches, it is true; but the salient ends are well flanked, and the defence from open ramparts is preferable to the firing from the detached and inconvenient galleries of redoubts.

These star forts, however, are not adapted to the purpose of my proposed line, from the important reason that one third of each of the two sides, which would face towards the curtains to be flanked, is prevented (by its being broken forwards to flank the ditches of the remainder) from giving its fire in the direction of the curtain. Besides, star forts are, not so easily as redoubts, adapted to irregular ground; and after passing a certain size, (say of 8 points, with faces of 60 yards, and with a garrison of 600 troops,) a better form will be found in the bastioned fort, in which the flanking lines do not bear so large a proportion to the main lines of the work as one-half—the ratio in the former. Even in the bastioned fort, however, there is too much indentation of the rampart, and too much sacrifice of the most essential condition that inclosed works ought to satisfy in lines.

In view, therefore, of all the arguments for the different sorts of enclosed works for the purpose in question, I should be inclined to choose redoubts, even if made on the plan of flanking by timber galleries. But when we consider that, in the case in question, these timber galleries may be dropped, and a much more convenient, consolidated, and infinitely stronger flanking arrangement substituted for them, there can no longer be any hesitation in the choice. * *

Eighth. In the Brooklyn lines proposed, there is no reason for not making the 15 or 17 redoubts that will be necessary of a permanent nature.

A revetted, partly detached, scarp would render each one impregnable; and then a judicious location of them would render the whole line impregnable. I use the word impregnable in consideration of the probable length of the attack, and of the supplementary means of defence, which I will point out beyond, to resort to, in case of a more obstinate attempt.

The redoubts, if revetted, should have three bastionnets, or reciprocally flanking masonry caponniéres. These should be put at the salient and two shoulder angles. There should be two half bastions at the inner ends of the flanks, and joining to these would be the two half bastions of the gorge front.

The use of masonry at the three outer angles is here unobjectionable, comparatively, with the requirements of the general theory of the defence. They cannot be attained and breached, or counterbattered, by any sort of artillery firing, except from batteries placed on the edge of the ditch; for, being close to the counterscarp, (which is only the width of the ditch from them in the direction towards any other location of the enemy's batteries,) they cannot be reached by the most curved of ricochet fire; and as to the breach batteries re-

ferred to, they cannot be placed until after a siege, and I believe not then, if the supplementary defence I will mention is adopted.

To describe briefly the bastionnets specified, it will be sufficient to state that they are casemated caponniéres, which are placed something like the tours bastionnés of Vauban's second and third systems. They are armed with howitzers for firing cannister and small grape, and completely enfilade the ditches by a grazing fire. Their shape is bastioned, so as to prevent any dead angles being occasioned at any part of the scarp. They do not extend above the coping of the scarp, and are consequently hidden from all exterior views by the crest of the glacis.

The half bastions, which flank the outer half of the flanks of the redoubts, are preferable to bastionnets, because the ditches they enfilade, lead towards the front, and thereby offer a chance to the enemy to open a curved fire along them which would breach casemates or any detached scarp of flanks at their inner ends.

With regard to the profile, the redoubts in question ought to have their ramparts and parapets of the usual dimensions; though the last perhaps had better be twenty-five feet thick on the flanks and faces.

The scarp for its entire circuit should be twenty feet high; but of this the upper eight feet should be a thin detached wall, arranged with a banquette three and a half feet high. This detached wall should follow round the coping of the bastionnets.

On the gorge side the scarp might be detached in the same manner on the faces and flanks of the half bastions; the curtain would most likely be formed of a range of bomb-proofs, for shelter, and to hold powder and stores.

It is certain from the experience at Sevastopol, in 1854 and 1855, that mortars will form a preponderating element in future siege trains; their shells will demolish and level thin parapets, and will render uninhabitable any works not profusely supplied with bomb-proofs.

There should be, consequently, enough of the latter in each redoubt to suffice for holding all its stores of powder and a fair supply of provisions, with a surplus depending on the money disposable for the purpose. The three bastionnets, it will be noted, are bo mb-proof.

If the enemy should make his preparations, before any part of the line, for shelling it, the redoubts of that portion should immediately be filled with laborers, and a great number of temporary bomb-proofs of beams and earth be constructed at the foot of its terreplein slopes,* or under the rampart, or entirely under ground.

The parapets are made thick enough to prevent their being blown away by the bursting in them of large shells, which would otherwise open a view into the interior for the enemy's artillery.

Several reasons concur to recommend the partial detaching of the scarp, so as to form a chemin-des-rondes and breast-height wall.

In the first place, there will be a considerable saving of expense

* The experience of Sevastopol shows that the army defending lines, or an entrenched camp, can, by the assistance of a few works to prevent immediate attack, so fortify any one menaced point as to put it in a condition not to be taken without a siege.

effected by the diminution of masonry, which amounts to about a cubic yard for every lineal yard of wall.

2d. The work is rendered thereby much more secure against attacks by storm, because the banquette in rear of the thin wall may be lined, during the assault, by two ranks of troops, who can open a direct and plunging fire on the assailants, crowded together in the ditch below. The short range at which this fire will be delivered will cause it to be exceedingly effective. These troops can also take hold of the ends of the scaling ladders which the enemy may rear against the scarp and cast them off and dash them to the ground before any stormers had time to mount them.

3d. In order to give the space necessary for the banquette, and for a free communication behind it, between the thin wall and the exterior slope of the parapet, the mass of earth forming the latter must be set back a certain distance from the edge of the scarp.

There is thus a little room subtracted from the interior area of the work, and the parapet is a trifle shortened ; but, in redoubts of the size I recommend, neither of these consequences are at all objectionable. It is only in the diminutive two and three story forts of our sea-coast, that every foot of space has to be studiously economized, and want of room is an insuperable obstacle to the use of the chemin des rondes.

There is, however, a great and solid advantage which is consequent upon thus setting back the weight of the parapet from the sustaining wall.

The latter may be breached and tumble in ruins into the ditch, without the earth of the parapet even tending to slide down after it; while the parapet, in case it does rest close to the scarp, is entirely undermined when the latter falls, and caves in, together with some of the rampart on which it rests, so that not only is there an easy ascent provided for the enemy by the earth assuming over the ruins of the wall its natural slope, but the interior of the work is opened to the enemy's marksmen and artillery, which will render it difficult to make a hand to hand defence of the breach.

Take the case, however, of the partly detached scarp, and suppose it to be breached ; there is less wall to fall in, and the earth which follows it in its fall is a small triangular prism, which slides off on a plane which is nearly the prolongation of the exterior slope of the parapet ; the latter is, therefore, not even reduced appreciably in thickness, and, as a covering mass and as a breast-work, remains as good as ever.

All the enemy gains, therefore, in this case, by breaching the scarp, is creating a steep slope to ascend by, without diminishing the offensive powers of the work or preventing the adoption of all sorts of arrangements for the close defence of the breach.

These are the main advantages secured to the defence by the adoption of the chemin des rondes and its covering wall. It will be seen that it is especially suitable for the isolated redoubts proposed for the Brooklyn lines, and that the simplicity of the latter, and their considerable area, render the introduction of this arrangement uncommonly free from any counterbalancing objections.

There are one or two of the latter which it may be well to mention, though they are of much less weight in the case of these redoubts than as applied to extensive fortresses; and even in recent examples of these in Europe we find many instances of the use of the chemin-des-rondes.

The chemin-des-rondes is said to give a facility to the enemy, after he has gained the top of the wall at any point, to extend his troops to the right and left so as to mount at the same time a wide extent of the parapet. However, the garrison has also a better opportunity of preventing the first lodgment, and of reinforcing more promptly the troops defending the point where the enemy succeeds in gaining a footing.

Another defect attributed to the thin covering wall is, that it may be knocked down very soon by the enemy's artillery. This is not, however, so much the case if it is hidden from exterior view by the glacis, as it can then be reached only by curved fires, which are uncertain.

Another consideration is, that probably only a short extent of the wall, on the faces, will be demolished, while that on the flanks and gorge will remain intact. This will also be the case only for the one or two redoubts that may be bombarded, while the eighteen or nineteen others enjoy all the advantages of the arrangement, without being subjected at all to this drawback.

Now, even supposing that a considerable length of the wall, on the faces of one or two redoubts, should be ruined, the chemin des roudes would still have effected, for these redoubts, all it was intended to perform.

If the enemy had tried to storm them before deciding to take the time and pains to plant his heavy guns and wait their effect, he will have been repulsed with severe loss—a result, in a good measure, attributable to the detached scarp; and it is certain that the knowledge of this construction would tend to prevent the experiment being tried, and thus occasion the delay necessary to construct batteries and arm them.

There would thus be gained by the defenders several days, which they could turn to profit by putting the redoubts attacked into a perfect state of defence by the construction of fougasses, mines, palisades, and all sorts of obstacles, and by crowding them with men, and sheltering the garrison with a great number of bomb-proofs.

In the rear and on each flank new field works and batteries could be thrown up and armed; while the interior preparations were in progress, the former should bear upon the approaches to the redoubt, and strengthen it by their fire.

It will be recollected that the flanks and gorge remain intact, and that 12 feet of scarp, at least, remains on the faces throughout, and there is, consequently, if the work has a large garrison, no probability of the work being *surprised*, a contingency that scarps are intended especially to prevent; hence an assault ought to be frustrated with certainty, considering the time and means that have been disposable in preparing for it.

As the redoubts I propose are the main feature of the line, I have

discussed them at much length ; the strength of the system, however, depends, not so much on the individual strength of these works, but on their acting in concert and harmony with the earthworks which form the continuous barrier.

With regard to the efficacy of inclosed forts in strengthening a line of field works, we have any amount of testimony from history. The employment of strong redoubts and forts on the summits of all the hills which formed salient portions of the lines of Buntzelwitz is an example. The number and magnitude of the redoubts in the lines of Torres Vedras, and their heavy armaments of cannon, show that Wellington placed great confidence in them. The vigorous defence of the signal redoubts in the lines of the Nivelle, which did not surrender till the open works had been forced, goes to show that with all the disadvantages of a false position and incomplete communications, these lines might have held out if they had been more frequently garnished with similar works.

At the entrenched camp of Drissa, the main reliance was upon redoubts, which were palisaded with care, and so placed that the enemy could not force the general line by merely overrunning the intermediate entrenchments ; he was obliged to take two or three redoubts ; a certainty which warranted the Russians in fortifying these points as they did.

The efficacy of inclosed works was strongly exemplified at the battle of Borodino, where the single redoubt of Chewardino, situated 2,000 yards in front of the line, on a hill, after being assaulted and taken three times, was not securely possessed by the French, till 10 o'clock at night, after a sanguinary struggle of sixteen hours. To gain this point was of the highest importance in the eyes of Napoleon, who designed to refuse his left, pushing his right forward. This single redoubt therefore, (says M. De Sellon,) permitted the Russians to dispute the decisive point for a whole day. In the same battle the Russian left was protected by some works in advance of the heights of Semenofskoi, and it is due to these, that this part of the line held out as it did, for six hours, against the enormous masses which Ney and Davoust had accumulated upon this point of attack, which was subjected also to the fire of near four hundred pieces of artillery.

The great redoubt of Borodino was not taken till towards 3 o'clock in the afternoon, after having cost the lives of several thousand soldiers ; it was the resistance of this redoubt to the assaults of the viceroy, that prevented the latter from effecting (as Napoleon intended,) a break between the centre and left wing of the Russian army.

The small redoubt, on the British left at Inkerman, had a great share in influencing the result of that battle, enabling the guards to hold out till reinforcements arrived to their support, and these, likewise, resisted long enough to give the French an opportunity to discover that the demonstration in the right was a feint, and to repulse the enemy by their rapid movement, which attacked the Russians in flank.

The French lines (the 2d line) before Sebastopol, exhibits almost the identical arrangement of pentagonal redoubts, and curtains that I propose to adopt; the location of the redoubts upon the advanced and

elevated portions of the site, and the junction of them by nearly straight lines of entrenchments, are features worthy of imitation.

In the advanced line of the Allies, reaching from Balaklava to Inkerman, we also find redoubts occupying some of the most important points of the topography.

The consequences of relying upon open field works, that is, either of continuous lines or lines with intervals, made up of elementary works which are open behind, and which can consequently be turned and rendered useless by an army who can gain a foothold in any quarter of the line, are exemplified in the fate of the French lines at Mayence, at Turin and at Malplaquet.

The same causes led in each of these cases to the loss of the position; they each exhibit a dissemination of the troops, rendered necessary by the nature of the works, which require that every yard of parapet shall be manned from one end to the other; the consequent weakness of the whole line at every point, and the inevitable yielding of the thin rank of troops, guarding the points assailed by overwhelming columns of the enemy, are seen in each instance; this succession of events is rapidly followed by the advance of the consolidated forces, who have penetrated the line, upon the defending troops who have not had time to form, in order to meet an attack in the rear, which completely spoils all previous plans for a successful resistance. * * *

Ninth. The entrenchments connecting the redoubts should be defended by a line of skirmishers only, to accord with the general theory of the system; they should not therefore be revetted lines, but earthworks, thrown up on the anticipation of a descent on the island, and strengthened by abattis and *trous-de-loup* on the slopes in front.

The ditch and parapet should run *in a direct line*, or a re-entering angle, from one redoubt to the other, and in such a manner that the reverse or inside of the latter could be enfiladed from the redoubts.

The position this curtain must occupy being known in advance, there is a very cheap obstacle which might make the approach to the line quite difficult. I allude to thorn hedges, which should be planted as thickly as possible, where circumstances admit.

The curtains thus laid out and strengthened, would offer sufficient impediment and sufficient cover for a line of skirmishers to oblige an enemy, who might endeavor to pass them in preference to assaulting the redoubts, to make his attack in heavy columns; for any other disposition of his troops would be too weak to force the skirmishers to retire.

But the numbers and compactness of a column render it a mark that is difficult to miss, and the columns of attack in question must advance under a double or triple fire, both from the redoubts, which open with artillery, (the nearest one with an effective musketry also) and from the skirmishers in front, sustained by the reserve.

Under these circumstances, the probable losses would be excessive, and would appear sufficient to frustrate the attempt to pass between the redoubts; so that even the temporary field works recommended would probably necessitate the siege of one or more of the latter; should that be found to be the case, the entire duty of the intermediate entrenchments, in the general scheme of defence, would be fully accomplished,

and I think there would no longer be any doubt of the complete efficacy of the system; for I have already shown that the redoubts are proof against surprises or escalades, or attack by storm, preceded by bombardments, and that consequently a siege is necessary to gain possession of them.

But while the batteries, parallels, and approaches of an attack in form are being constructed, there can be at least as many hands employed on this side of the lines in strengthening them, and throwing up additional redoubts and batteries in rear of them, so that it may safely be assumed that the new works will render the first line as impregnable to a siege as it was at first to a precipitate attack. * *

Tenth. An easy and rapid communication from one wing to the other is an essential requisite of a good system of lines; the advantages of it appear in many of the examples I have adduced, and the results of a neglect of arrangements for this purpose, or of localities which prevented such arrangements, are evident in others.

For instance, the lines of Buntzelwitz were thought to owe much of their strength to the free communication, from one point to another, afforded by a fine plain, which was adapted to the manœuvres of all arms of the service; and the existence of a wood which concealed the movements of the troops, in part from the enemy, was considered to be an additional advantage.

The left of the lines of Torres Vedras was much strengthened by being posted in advance of a good road, which ran for about ten miles parallel to the fortifications.

According to Napier, Soult owed his defeat, at the lines of the Nivelle, in a certain measure, to the want of roads or communications of any kind along his position.

In the case of the Brooklyn lines, there should be a hard wide road leading the whole length of them in their rear, and in addition to the already existing plank and other roads, two or three roads might on occasion, be improvised, leading from some central position in the rear, where the reserve would be posted; for besides parallel manœuvres, there should be every facility for the latter to march directly upon either quarter of the line that might be menaced by the enemy, and it can be shown, beyond doubt, that it is the judicious management of the reserve which will constitute the safety of the system.

Some of the roads specified would have the great advantage of being completely hidden from any views of the enemy, who must therefore remain partly in ignorance of the movements of the reserve: while on the contrary, every manœuvre of the latter would be discovered, from the parts of the lines situated on the summits of the hills which overlook the country all the way to the sea shore. * * * * *

Eleventh. Transmission of intelligence and orders: There is in a fixed position, which is occupied long beforehand in expectation of attack, every facility for making perfect arrangements for conveying, instantly, information to the headquarters and to the posts interested, of every movement of the enemy: and the rapidity and certainty which a proper organization will impart to combined movements of different divisions, are so valuable, that no pains should be spared to insure them.

The means usually resorted to have been the semaphore, and for night use, rockets; but in foggy weather both are rendered useless, and the rockets are apt to be confounded with shells thrown by the enemy, or the similar signals of the latter; besides, rockets can only be a very meagre reliance.

On these accounts it will be found worth while to establish an electric telegraph along the line as a check on the former methods, and even as a main reliance, for its scope is much greater than the semaphore, which is limited to a set of preconcerted signals; it is also less liable to great errors.

Besides some semaphores there should, therefore, be telegraph wires laid along the line, having stations in the redoubts; and similar lines should run along the radial roads to the general headquarters at the central position. They need not, of course, be established till the necessity occurs. * * * * * * *

Twelfth. Convenient débouchés should be arranged to permit the reserve to attack the enemy in turn, in case he should be repulsed so as to warrant the attempt. * * * * * *

Thirteenth, and lastly: Not only the construction of the lines should be correctly planned, but the manner of defending them must be in harmony with the nature of them.

The redoubts are proof against assaults, and consequently, against the most violent siege; for the trenches and batteries of the enemy can be responded to by superior works thrown up by the garrison during the siege; there is however a remote possibility of an assault giving the enemy a temporary footing on the curtains, which are, from economy, of earthwork. Instead, therefore, of posting all the troops, not required for the garrisons of the enclosed works, along the curtains, the greatest solicitude should be to maintain a strong reserve, which, being in constant communication with the line, by means of signals, should continually manœuvre so as to be opposite the main point of attack.

Should the enemy break through the line between two redoubts, he will have suffered greatly from the fire of the troops in the entrenchment, and likewise from the redoubts on each side while advancing to it, removing or breaking down the abattis and other obstacles, and climbing the ditch and parapet. On attaining the rear side of the breastwork, he will find that its defenders have taken shelter behind the redoubts on either side, and that they are firing upon his flanks from their new position, which is reinforced, perhaps, by the garrisons of the adjoining lines of curtain. All the time the artillery and musketry fire of the redoubts will continue, and the enemy must experience considerable losses while amassing his troops to march against the reserve, which will now be at hand, to take part, either offensively or defensively, in the combat.

It might happen that the general in command might see an opportunity of sallying out beyond the line during the attack, and throwing his whole force on the flank of the enemy.

I have said enough, however, to make clear the general method which alone would be suitable to the defence of such a line as I propose for the defence of New York.

With this fundamental idea, the rest must depend, as in all battles, on the time, place, and opportunity. No perfectly elaborated arrangement can be followed out strictly, and as many battles have been won by the inspiration of the moment as by preconcerted plans. * * *

This appears to be a proper place to allude to a plan for the defence of Brooklyn, which resulted (some 15 years ago, I believe,) from the conferences of a board of engineers. This plan, however, has never been made public, nor has it, to the best of my information and research, ever been offered, officially, even to the Chief Engineer, much less to the Secretary of War, or to Congress: hence the fact of such a plan having been discussed does not conflict with my assertion in the preface, that the government has never been warned of the danger to New York from descents upon Long Island, and still less been presented with any plans for their prevention.

This plan I have not been able to find in any printed or written documents, and have heard it stated differently by the officers who have mentioned it. One account is that Brooklyn was to be isolated from the rest of Long Island by a "chain of permanent redoubts," extending from Willet's Point, along the hills, to Fort Hamilton, (a distance of 21 miles,) to be connected, in time of war, by a line of field works. Another account states that permanent redoubts are to be used, but that they are not to constitute a line, but merely to occupy the important points along the ridge in question.

Applying the principles elucidated in the foregoing general discussion on lines to these plans, the defects of the latter become manifest.

In the first place, however, let us inquire what sort of redoubts would be used, and the answer may be guessed, if we observe the nature of that one which lies at present at the right flank of the proposed line. I refer, of course, to the redoubt of Fort Hamilton.

This redoubt is insignificant in size, being 32 yards square *on the outside*. It has 8 guns in barbette, which take up about half the room on its contracted terreplein, leaving space for perhaps 30 or 40 men, in two ranks, to fire in either direction. Its parapets are but 4 feet thick, and are of masonry, which a short cannonade would knock down, leaving the terreplein open to a rifle fire, which would soon clear it of its defenders.

If these redoubts are to be used merely as auxiliary defences, that is, as strengthening particular important points, and are intended to hold out only against an attempt at storming, they will be less objectionable than in any other point of view; but they are too small to hold a garrison whose fire shall be of any hindrance to the passage of a strong column in their vicinity—an inconvenience which might also be avoided by the enemy, as they would be very far apart; and if subjected to a cannonade they must certainly fall.

Besides, this hypothesis involves necessarily that of an active defence of the position by an *army in the field*, and I have already shown that all defensive plans which rest on the basis of an army of militia must calculate to place the latter behind entrenchments of some kind, so as to neutralize the immense advantage which veteran troops have over them, if they have a chance to manœuvre against them in the field.

If, on the other hand, the redoubts were intended to strengthen a

continuous line of field works, the plan of the board appears in a still worse light; for how can a line of 21 miles in extent, open to attack at all points, be defended by any number of works of this weak description?

It must be recollected that the plan under discussion was proposed before the invention of the Minié rifle, or rifle musket, and hence the redoubts must have been calculated to occupy intervals of 600 yards at the maximum; this involves the construction of *over* 60 *redoubts;* (a number that will appear great when compared with the 15 or 17 redoubts of my plan;) now, if made strong, each of these redoubts would want a large garrison, and an entire army of 50,000 or 60,000 men would be required to hold them all, without counting the 100,000 men or more that would be needed to garrison the line of field works and furnish a reserve; if the redoubts were, on the contrary, intended to be of the same size, and to have an equal garrison with the one at Fort Hamilton, then the line would certainly be broken through by a determined assault, or by several simultaneous assaults, which, *on so long a line* would prevent any relief being sent from one wing to the other.

I hardly think, however, that any officer will be found to advocate the plan just criticised; for, if any should satisfy himself that a line 21 miles long could be defended by either system of redoubts and entrenchments that could have been meant by the board, he must at least concede that a line 14 miles long is much easier guarded; and that when the latter is so located that only 6 miles of it can be attacked at a time, and arranged to correspond with a defence by the new rifle musket, it may be regarded as impassable, and a hundred fold superior to that of the board.

Finally, the west half of the site that was proposed for this line, by the board, is now laid out in streets, built up, occupied by cemeteries and reservoirs, or otherwise appropriated for other purposes than military ones.

CHAPTER VI.

SUMMARY OF THE MEMOIR.

It is the intrinsic military advantages as a defensive position, of the line I propose to fortify, that render the defence of Brooklyn feasible, and these advantages are independent, in a great measure, of the *system* according to which the works are projected.

I, therefore, invite particular attention to the following comprehensive tableau of the line, in which its grand properties, extent, and merits are set forth, disembarrassed of minutiæ of topography, and not confused by reference to the means or mode of its defence.

1. The line extends from the head of Flushing bay to Fort Hamilton. It thus isolates Brooklyn from any point of Long Island where an expedition can land; for no fleet can pass the forts on the East river, and these are below Flushing bay; nor can a fleet pass the batteries on the Narrows where Fort Hamilton is situated.

2. The line is 15 miles in extent, involving the fortification of a length of $14\frac{1}{4}$ miles, and comprises three grand divisions of nearly equal length.

The first division is of 6 miles, and runs from Fort Hamilton, east, to Jamaica bay. This division fronts towards Gravesend bay and Coney Island.

The second division borders the marshes of Jamaica bay, running northeast for 4 miles, and opposes any landing on this shore.

The third division is 5 miles long; it runs north from the shores of Jamaica bay to the head of Flushing bay, and stands in the way of any approach from any point on the Sound or Atlantic shores of Long Island.

3. The principal merit of this line, which renders its defence a matter of certainty, and which follows from the fact that each of these three divisions rests both flanks upon the water, is, that whatever part of Long Island an expedition might land at, the latter would be checked in its advance by a single division of the line, and would be restricted to the attack of this one.

In other words the three divisions are isolated from each other, and it is impossible to march around the exterior of the line from one division to another.

This extraordinary natural property of the line has this inestimable consequence; that although the line is 15 miles long, only 5 miles of it, or 6 miles at most, will ever need to be defended at a time. The entire force behind the lines can therefore be concentrated upon either division the moment that the news of the debarkation of a foreign force upon the island is telegraphed to Brooklyn. * * * * *

A similar condensed description of my plan for fortifying this line, and a brief exposition of its advantages, are as follows:

1. The two divisions facing the south and east to be made the

strongest, because they are the longest, and liable to regular land attacks, aided by artillery.

The division fronting on Jamaica bay to be calculated to resist gunboat attacks, and a debarkation within effective cannon range.

2. The fortifications on each division to be an uninterrupted line of earthwork entrenchments, but with arrangements for sorties, and flanked and otherwise supported, at distances of 1,400 yards, by detached redoubts with masonry scarps, which shall be impregnable against any assaults or attempts at storming.

3. The heavy artillery to be placed in the forts, where it shall sweep all the country in front, and take in flank an enemy marching to the assault of the lines of earthwork between the forts.

The light artillery to be placed, on the day of battle, wherever it may seem that it is most wanted, behind the earthworks.

The defending army to be stationed so as to form two ranks for the entire length of the earthworks, and to furnish the forts with garrisons of 2,000 men each : the remainder of the troops to form a reserve to march to the assistance of the point most violently attacked.

4. Estimates.—Thus posted an army of 50,000 men would defend Brooklyn against any army that could be brought against it ; 20,000 men would guard the earthworks, and 15,000 would hold the forts, while there would be left a reserve of 15,000 to aid in the defence at the decisive point of attack.

It will be seen that the above calculation provides for the defence of only 6 miles in length, or of only a single division, though the largest of the line ; but it will be recollected that only one division can be attacked at a time. No general would split an army, however large, to land half of it to the east and half of it to the west of the lines ; to divide an army into isolated corps, without concert or communications of any sort, in order to attack a consolidated enemy, would be a gross military blunder.

It is true that a gunboat attack upon the centre division might take place simultaneously with the assault on the division on the right or left, and in view of that, the estimate for the garrison of the lines may be increased by 5,000 men, and to guard against all possible attempts on the remaining division which might take place as diversions to distract the defence, we will allow for the remaining division a garrison of one-third the full quota, say 10,000 men, which may be regarded as constituting a second reserve. The total number of troops that can ever be required to man the lines, allowing for a reserve of 25,000 men, is, therefore, 65,000. This number of troops can be furnished at a few days' notice, and fully armed and equipped, from the city and State of New York alone ; and I believe that they are equally well suited to defend the above projected works as the works themselves are to the defensive position which I indicate.

To utilize the valour and marksmanship of our militia, their general should place them so that each man's duty will be simply to defend his post ; in this way the advantage that foreign armies would otherwise enjoy, that of outmanœuvring our troops in the field, would be neutralized.

This has been my leading principle in selecting the defensive posi-

tion, and in deciding on the nature of the works which should render it impregnable.

It is this principle also which renders absurd the lines of detached redoubts, proposed by some engineers, to extend from Fort Hamilton to Willet's Point; and doubly absurd the scientific "rule and compass" arguments of others, who prove that no attack will ever take place on Brooklyn, because, they say, the enemy's rear, flank, or communications, might be cut off should he attempt one.

I regard it as an important advantage of the proposed lines, that, being convenient of access to the city, the redoubts can be made the rendezvous of militia and volunteer regiments and companies, for the purposes of drilling and target-firing.

Let each regiment have its station assigned to it in the line, permanently, so that in practicing and marching, in and to that vicinity, it may become acquainted with the face of the country, the roads, and the ranges at which artillery and musketry will begin to be effective from the particular redoubt, to which it belongs.

The redoubts would, I believe, be accepted by the New York regiments with pleasure, if offered to them to use as armories, and storehouses, and places of rendezvous; and the government would, by such an arrangement. have the works taken care of free of charge.

The lines would in this manner be, very probably, made a popular resort for pleasure excursions, and as a pleasant drive, and so form an additional attraction in the vicinity of the city.

It would be premature, in this memoir, to present any estimate of the cost of such a line of fortification as I propose; but I must, at any rate, anticipate the possible objection that its expense would be out of proportion to its value to New York.

The line can, in fact, be constructed with extraordinary economy. The land which must be bought for the sites of the redoubts will not cost much, for no part of the line is located in built districts, or within the corporate limits of Brooklyn, or even upon valuable farm land; on the contrary, the plats of ground which the government will require, lie either on bare and stony or wooded hill tops, or on sandy and cheap cultivated ground, or on meadows and marshes.

As to the building of the redoubts, I respectfully propose that the City of New York should take the contract for the entire work, and that it shall use in the execution of it the forced labor of all the convicts in its City prisons.

If this arrangement were adopted, the City would be benefited by having the expenses of its convicts paid by the federal government, while the latter would get its work done at an absolute minimum of expense: seeing that the cost of it would amount to no more than the bare wholesale value of the materials, and the actual expense of boarding and lodging the masons and laborers; the profits of the workmen being in this case lost by them, and paid by neither party of the contract.

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